



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

**FOR**  
**802.11n 2X2 PCIE MINICARD TRANSCEIVER**  
**MODEL NUMBER: AR5BHB92**  
**FCC ID: PPD-AR5BHB92**  
**IC: 4104A-AR5BHB92**  
**REPORT NUMBER: 08U11571-1**  
**ISSUE DATE: MARCH 13, 2008**

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## TABLE OF CONTENTS

|                                                         |           |
|---------------------------------------------------------|-----------|
| <b>1. ATTESTATION OF TEST RESULTS</b>                   | <b>6</b>  |
| <b>2. TEST METHODOLOGY</b>                              | <b>7</b>  |
| <b>3. FACILITIES AND ACCREDITATION</b>                  | <b>7</b>  |
| <b>4. CALIBRATION AND UNCERTAINTY</b>                   | <b>7</b>  |
| 4.1. MEASURING INSTRUMENT CALIBRATION                   | 7         |
| 4.2. MEASUREMENT UNCERTAINTY                            | 7         |
| <b>5. EQUIPMENT UNDER TEST</b>                          | <b>8</b>  |
| 5.1. DESCRIPTION OF EUT                                 | 8         |
| 5.2. MAXIMUM OUTPUT POWER                               | 8         |
| 5.3. DESCRIPTION OF AVAILABLE ANTENNAS                  | 8         |
| 5.4. SOFTWARE AND FIRMWARE                              | 8         |
| 5.5. WORST-CASE CONFIGURATION AND MODE                  | 9         |
| 5.6. DESCRIPTION OF TEST SETUP                          | 10        |
| <b>6. TEST AND MEASUREMENT EQUIPMENT</b>                | <b>12</b> |
| <b>7. ANTENNA PORT TEST RESULTS</b>                     | <b>13</b> |
| 7.1. 802.11b DUAL CHAIN LEGACY MODE IN THE 2.4 GHz BAND | 13        |
| 7.1.1. 6 dB BANDWIDTH                                   | 13        |
| 7.1.2. 99% BANDWIDTH                                    | 15        |
| 7.1.3. OUTPUT POWER                                     | 16        |
| 7.1.4. AVERAGE POWER                                    | 23        |
| 7.1.5. POWER SPECTRAL DENSITY                           | 24        |
| 7.1.6. CONDUCTED SPURIOUS EMISSIONS                     | 28        |
| 7.2. 802.11g DUAL CHAIN LEGACY MODE IN THE 2.4 GHz BAND | 35        |
| 7.2.1. 6 dB BANDWIDTH                                   | 35        |
| 7.2.2. 99% BANDWIDTH                                    | 37        |
| 7.2.3. OUTPUT POWER                                     | 38        |
| 7.2.4. AVERAGE POWER                                    | 45        |
| 7.2.5. POWER SPECTRAL DENSITY                           | 46        |
| 7.2.6. CONDUCTED SPURIOUS EMISSIONS                     | 50        |
| 7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND              | 57        |
| 7.3.1. 6 dB BANDWIDTH                                   | 57        |

|        |                                                    |            |
|--------|----------------------------------------------------|------------|
| 7.3.2. | 99% BANDWIDTH .....                                | 59         |
| 7.3.3. | OUTPUT POWER .....                                 | 60         |
| 7.3.4. | AVERAGE POWER .....                                | 67         |
| 7.3.5. | POWER SPECTRAL DENSITY .....                       | 68         |
| 7.3.6. | CONDUCTED SPURIOUS EMISSIONS.....                  | 72         |
| 7.4.   | <i>802.11n HT40 MODE IN THE 2.4 GHz BAND</i> ..... | 79         |
| 7.4.1. | 6 dB BANDWIDTH .....                               | 79         |
| 7.4.2. | 99% BANDWIDTH .....                                | 81         |
| 7.4.3. | OUTPUT POWER .....                                 | 82         |
| 7.4.4. | AVERAGE POWER .....                                | 89         |
| 7.4.5. | POWER SPECTRAL DENSITY .....                       | 90         |
| 7.4.6. | CONDUCTED SPURIOUS EMISSIONS.....                  | 94         |
| 7.5.   | <i>802.11a MODE IN THE 5.8 GHz BAND</i> .....      | 101        |
| 7.5.1. | 6 dB BANDWIDTH .....                               | 101        |
| 7.5.2. | 99% BANDWIDTH .....                                | 103        |
| 7.5.3. | OUTPUT POWER .....                                 | 104        |
| 7.5.4. | AVERAGE POWER .....                                | 111        |
| 7.5.5. | POWER SPECTRAL DENSITY .....                       | 112        |
| 7.5.6. | CONDUCTED SPURIOUS EMISSIONS.....                  | 116        |
| 7.6.   | <i>802.11n HT20 MODE IN THE 5.8 GHz BAND</i> ..... | 123        |
| 7.6.1. | 6 dB BANDWIDTH .....                               | 123        |
| 7.6.2. | 99% BANDWIDTH .....                                | 125        |
| 7.6.3. | OUTPUT POWER .....                                 | 126        |
| 7.6.4. | AVERAGE POWER .....                                | 133        |
| 7.6.5. | POWER SPECTRAL DENSITY .....                       | 134        |
| 7.6.6. | CONDUCTED SPURIOUS EMISSIONS.....                  | 138        |
| 7.7.   | <i>802.11n HT40 MODE IN THE 5.8 GHz BAND</i> ..... | 145        |
| 7.7.1. | 6 dB BANDWIDTH .....                               | 145        |
| 7.7.2. | 99% BANDWIDTH .....                                | 147        |
| 7.7.3. | OUTPUT POWER .....                                 | 148        |
| 7.7.4. | AVERAGE POWER .....                                | 153        |
| 7.7.5. | POWER SPECTRAL DENSITY .....                       | 154        |
| 7.7.6. | CONDUCTED SPURIOUS EMISSIONS.....                  | 157        |
| 8.     | <b>RADIATED TEST RESULTS</b> .....                 | <b>162</b> |

|        |                                                                   |     |
|--------|-------------------------------------------------------------------|-----|
| 8.1.   | <i>LIMITS AND PROCEDURE</i> .....                                 | 162 |
| 8.2.   | <i>TRANSMITTER ABOVE 1 GHz</i> .....                              | 164 |
| 8.2.1. | TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND      | 164 |
| 8.2.2. | TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND      | 173 |
| 8.2.3. | TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND | 182 |
| 8.2.4. | TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 2.4 GHz BAND | 191 |
| 8.2.5. | TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND      | 200 |
| 8.2.6. | TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND | 201 |
| 8.2.7. | TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND | 202 |
| 8.3.   | <i>RECEIVER ABOVE 1 GHz</i> .....                                 | 203 |
| 8.4.   | <i>WORST-CASE BELOW 1 GHz</i> .....                               | 204 |
| 9.     | <b>AC POWER LINE CONDUCTED EMISSIONS</b> .....                    | 206 |
| 10.    | <b>MAXIMUM PERMISSIBLE EXPOSURE</b> .....                         | 210 |
| 11.    | <b>SETUP PHOTOS</b> .....                                         | 214 |

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** ATHEROS COMMUNICATION, INC  
5480 GREAT AMERICA PARKWAY  
SANTA CLARA, CA 95054 USA

**EUT DESCRIPTION:** 802.11n 2X2 PCIE MINICARD TRANSCEIVER

**MODEL:** AR5BHB92

**SERIAL NUMBER:** HB92-031-S0830 AND HB92-031-S805

**DATE TESTED:** FEBRUARY 25-29, 2008

| APPLICABLE STANDARDS                        |                         |
|---------------------------------------------|-------------------------|
| STANDARD                                    | TEST RESULTS            |
| CFR 47 Part 15 Subpart C and Subpart E      | No Non-Compliance Noted |
| RSS-210 Issue 7 Annex 8 and RSS-GEN Issue 2 | No Non-Compliance Noted |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN  
EMC SUPERVISOR  
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 C63.4-2003, 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. MEASUREMENT UNCERTAINTY

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

| PARAMETER                     | UNCERTAINTY |
|-------------------------------|-------------|
| Power Line Conducted Emission | +/- 2.3 dB  |
| Radiated Emission             | +/- 3.4 dB  |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11n 2x2 PCIe minicard transceiver, model AR5BHB92. Two front-end module parts were evaluated; vendors are SiGe (FEM1) and Hitachi (FEM2).

The radio module is manufactured by Atheros Communications, Inc.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

| Frequency Range<br>(MHz) | Mode         | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Total<br>Power<br>(mW) |
|--------------------------|--------------|---------------------------|---------------------------|-------------------------|------------------------|
| 2412 - 2462              | 802.11b      | 22.58                     | 22.12                     | 25.37                   | 344.06                 |
| 2412 - 2462              | 802.11g      | 26.44                     | 26.69                     | 29.58                   | 907.21                 |
| 2412 - 2462              | 802.11n HT20 | 26.50                     | 26.55                     | 29.54                   | 898.54                 |
| 2422 - 2452              | 802.11n HT40 | 21.58                     | 22.21                     | 24.92                   | 310.22                 |
| 5745 - 5825              | 802.11a      | 25.82                     | 26.12                     | 28.98                   | 791.20                 |
| 5745 - 5825              | 802.11n HT20 | 26.32                     | 26.07                     | 29.21                   | 833.12                 |
| 5755 - 5795              | 802.11n HT40 | 26.76                     | 26.91                     | 29.85                   | 965.15                 |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The 2x2 configuration utilizes a set of PIFA antennas with maximum gain of 3.62 dBi from 2400 – 2483.5 MHz, 4.63 dBi from 5150 – 5350 MHz, 5.56 dBi from 5250 – 5350 MHz, 5.34 dBi from 5470 – 5725 MHz, and 4.76 dBi from 5725 - 5850 MHz.

### 5.4. SOFTWARE AND FIRMWARE

The test utility and driver software used during testing was Art ANWI 1.4 and Devlib Revision 0.6 Build #18 Art\_11n.

## 5.5. WORST-CASE CONFIGURATION AND MODE

The 2x2 configuration was used for all testing in this report.

Both FEM1 and FEM2 boards were evaluated on conducted and radiated emissions tests to find the worst case.

The worst-case data rates are determined to be as follows for each mode, based on the investigations by measuring the average power, peak power and PPSD across all the data rates, bandwidths, modulations and spatial stream modes.

Thus all emissions tests were made with following data rates:

- 802.11b mode, 20 MHz Channel Bandwidth, 1 Mb/s, CCK Modulation, Spatial Stream 1.
- 802.11g mode, 20 MHz Channel Bandwidth, 9 Mb/s, OFDM Modulation, Spatial Stream 1.
- 802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS0, 6.5 Mb/s, OFDM Modulation, Spatial Stream 1.
- 802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS0, 13.5 Mb/s, OFDM Modulation, Spatial Stream 1.

Baseline testing demonstrated that the Power Spectral Density as measured through a combiner with both chains operating simultaneously is worst case.

For RF conducted emissions, all tests were performed on FEM2 board excepted conducted spurious to use FEM1 board.

For RF radiated emissions, all tests were performed on FEM1 boards.

For radiated emissions bandedge, both FEM1 and FEM2 boards were performed at both vertical and horizontal polarizations.

For radiated emissions TX below 1 GHz, RX spurious, and AC line conduction were performed at FEM1 board.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST |              |              |                       |        |
|-----------------------------------|--------------|--------------|-----------------------|--------|
| Description                       | Manufacturer | Model        | Serial Number         | FCC ID |
| Laptop                            | IBM          | ThinkPad T43 | I3-BR298              | DoC    |
| AC Adapter                        | IBM          | 08k8202      | 11S08k8202Z1Z6LR36000 | DoC    |

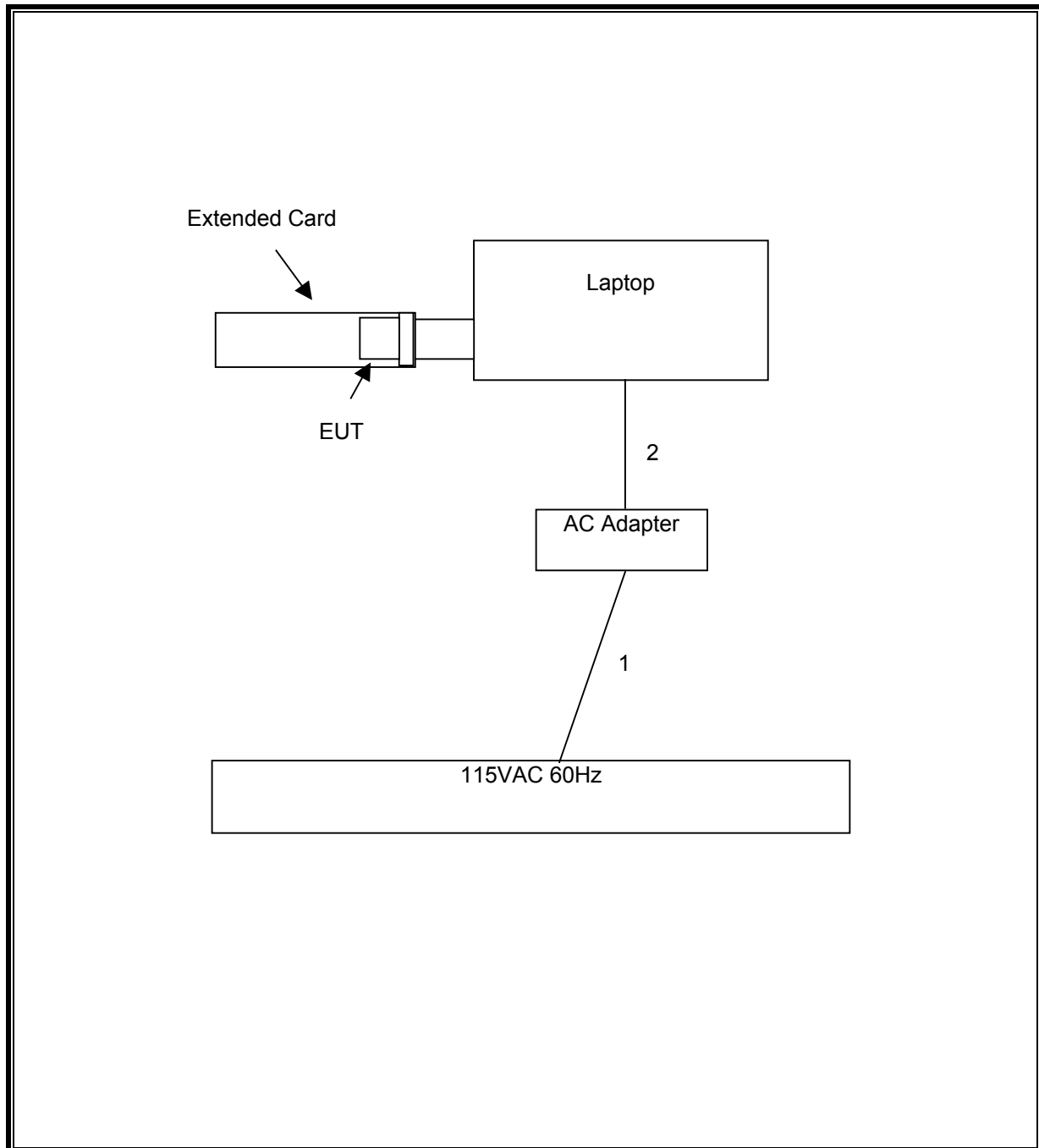
### I/O CABLES

| I/O CABLE LIST |      |                      |                |             |              |         |
|----------------|------|----------------------|----------------|-------------|--------------|---------|
| Cable No.      | Port | # of Identical Ports | Connector Type | Cable Type  | Cable Length | Remarks |
| 1              | AC   | 1                    | US 115V        | Un-shielded | 2m           | No      |
| 2              | DC   | 1                    | DC             | Un-shielded | 2m           | No      |

### TEST SETUP

The EUT is installed in a host laptop computer via an extended card 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 Date   | Cal Due    |
| Spectrum Analyzer, 44 GHz     | Agilent / HP   | E4446A           | C01012 | 12/3/2007  | 3/3/2009   |
| Peak Power Meter              | Agilent / HP   | E4416A           | C00963 | 12/4/2007  | 12/4/2009  |
| Peak / Average Power Sensor   | Agilent        | E9327A           | C00964 | 12/7/2007  | 12/7/2009  |
| Antenna, Bilog, 2 GHz         | Sunol Sciences | JB1              | C01011 | 9/28/2007  | 9/28/2008  |
| Antenna, Horn, 18 GHz         | EMCO           | 3115             | C00945 | 4/15/2007  | 4/15/2008  |
| Preamplifier, 26.5 GHz        | Agilent / HP   | 8449B            | C01063 | 9/27/2007  | 9/27/2008  |
| Antenna, Horn, 26.5 GHz       | ARA            | MMH-1826/B       | C00589 | 9/29/2007  | 9/29/2008  |
| Preamplifier, 40 GHz          | Miteq          | NSP4000-SP2      | C00990 | 10/11/2007 | 10/11/2008 |
| EMI Receiver, 2.9 GHz         | Agilent / HP   | 8542E            | C00957 | 2/6/2007   | 6/12/2008  |
| RF Filter Section, 2.9 GHz    | Agilent / HP   | 85420E           | C00958 | 2/6/2007   | 6/12/2008  |
| EMI Test Receiver, 30 MHz     | R & S          | ESHS 20          | N02396 | 2/6/2008   | 8/6/2009   |
| LISN, 30 MHz                  | FCC            | LISN-50/250-25-2 | N02625 | 10/25/2007 | 10/25/2008 |
| 2.4-2.5GHz Reject Filter      | Micro Tronics  | BRM50702         | N02685 | CNR        | CNR        |
| High Pass Filter 7.6GHz       | Micro Tronics  | HPM13195         | N02681 | CNR        | CNR        |
| Reject Filter, 5.15-5.35 GHz  | Micro-Tronics  | BRC13190         | N02679 | CNR        | CNR        |
| Reject Filter, 5.47-5.725 GHz | Micro-Tronics  | BRC13191         | N02678 | CNR        | CNR        |
| Reject Filter, 5.725-5.85 GHz | Micro-Tronics  | BRC13192         | N02676 | CNR        | CNR        |

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 802.11b DUAL CHAIN LEGACY 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)

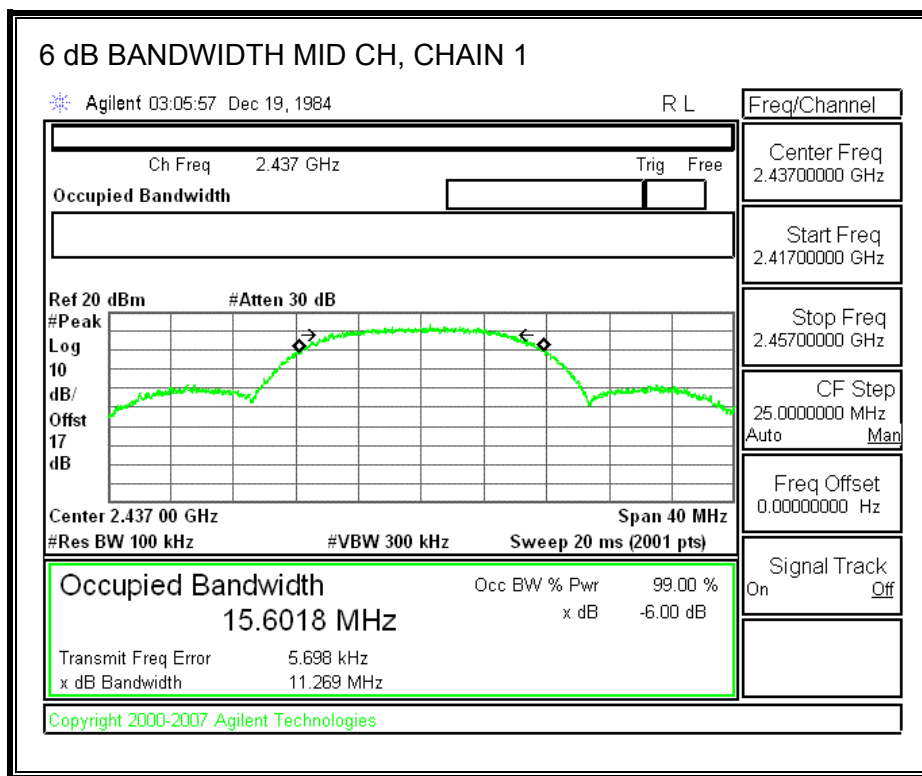
The minimum 6 dB bandwidth shall be at least 500 kHz.

##### 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<br>(MHz) | Chain 1<br>(MHz) | Minimum Limit<br>(MHz) |
|---------|--------------------|------------------|------------------------|
| Middle  | 2437               | 11.269           | 0.5                    |



## 7.1.2. 99% BANDWIDTH

### LIMITS

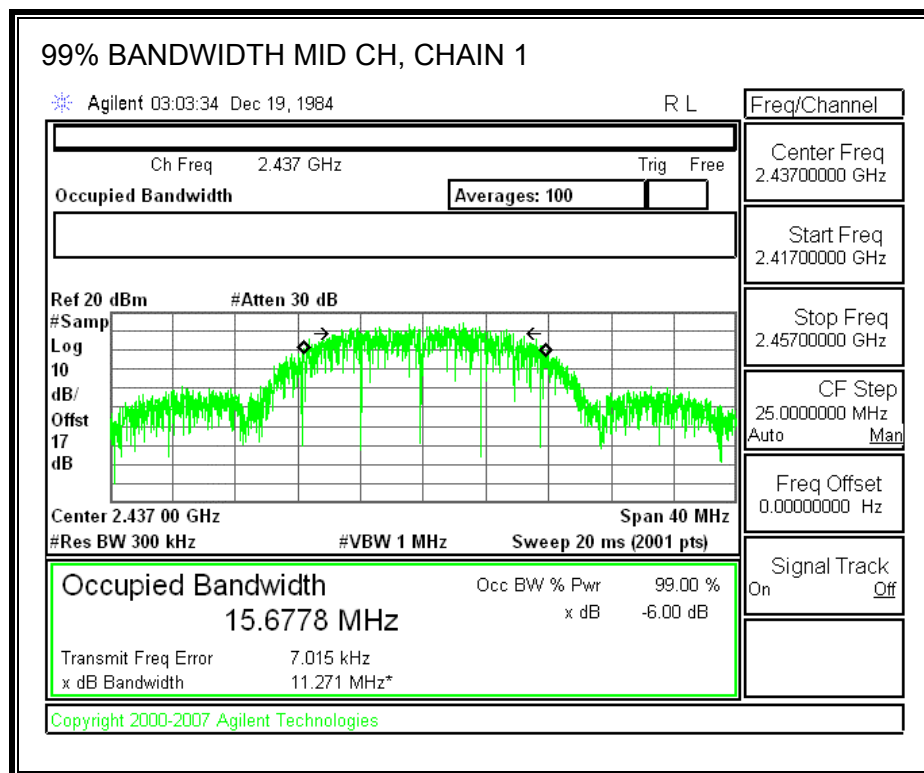
None; for reporting purposes only.

### 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<br>(MHz) | Chain 1<br>(MHz) |
|---------|--------------------|------------------|
| Middle  | 2437               | 15.6778          |



### 7.1.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

| Effective Legacy Gain<br>(dBi) |
|--------------------------------|
| 6.33                           |

The maximum antenna gain is 6.33 dBi for P-To-M; therefore the limit is 29.67 dBm.

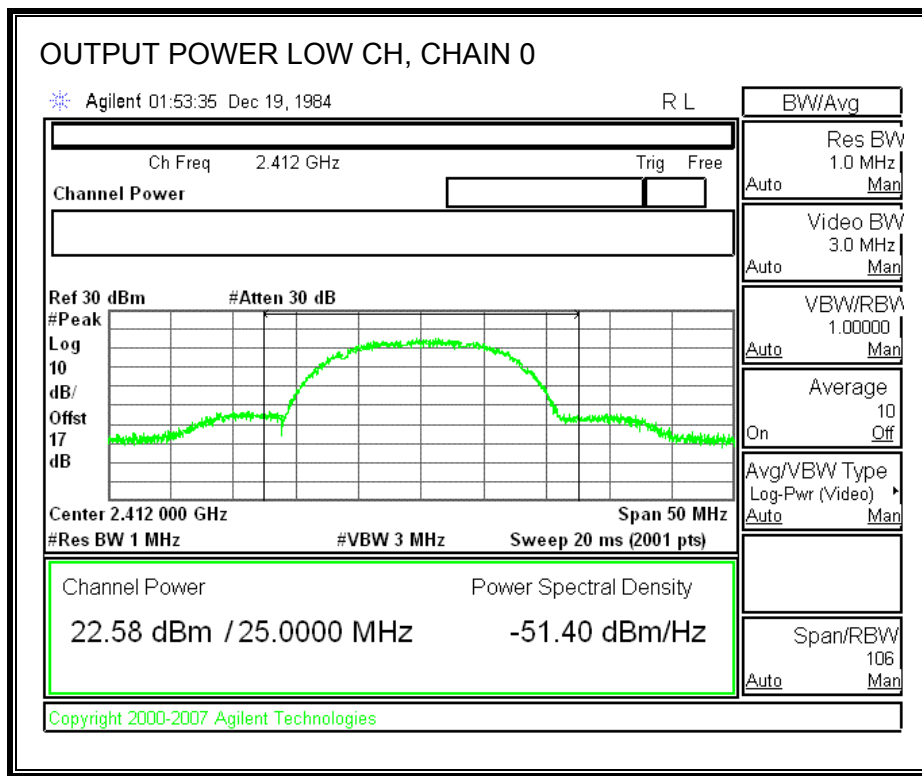
#### TEST PROCEDURE

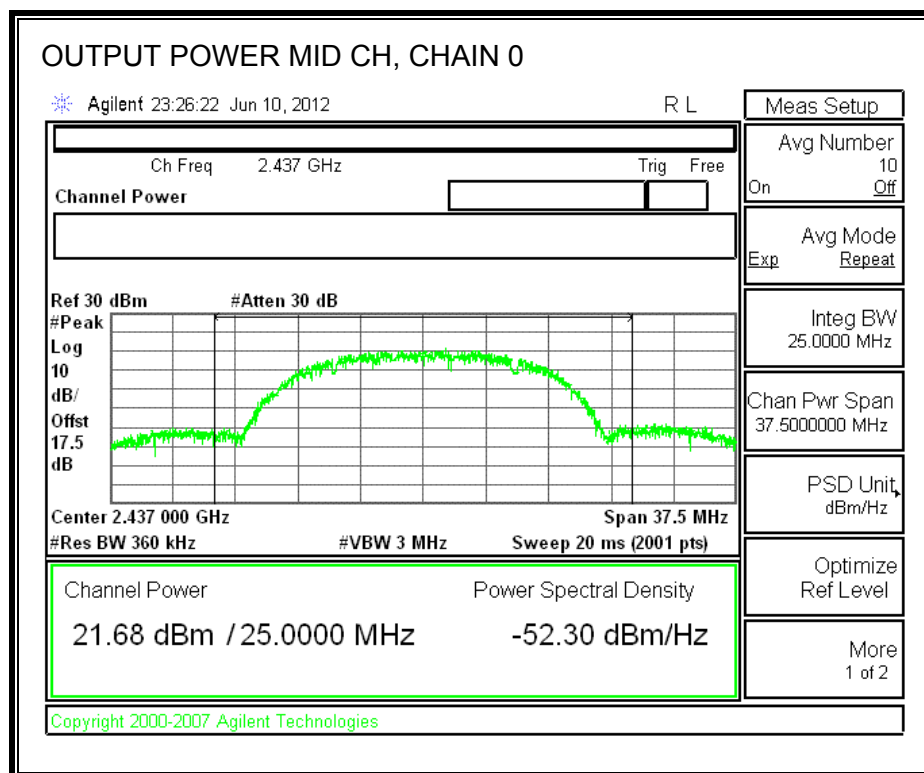
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

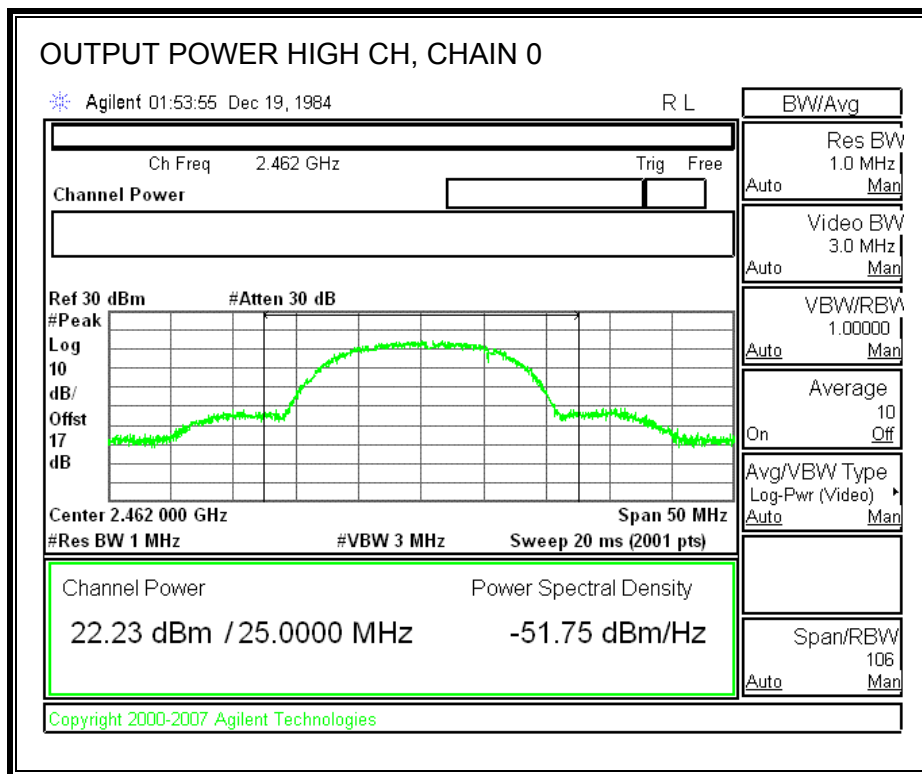
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 2412               | 29.67          | 22.58                     | 22.12                     | 25.37                   | -4.30          |
| Mid     | 2437               | 29.67          | 21.68                     | 21.98                     | 24.84                   | -4.83          |
| High    | 2462               | 29.67          | 22.23                     | 21.98                     | 25.12                   | -4.55          |

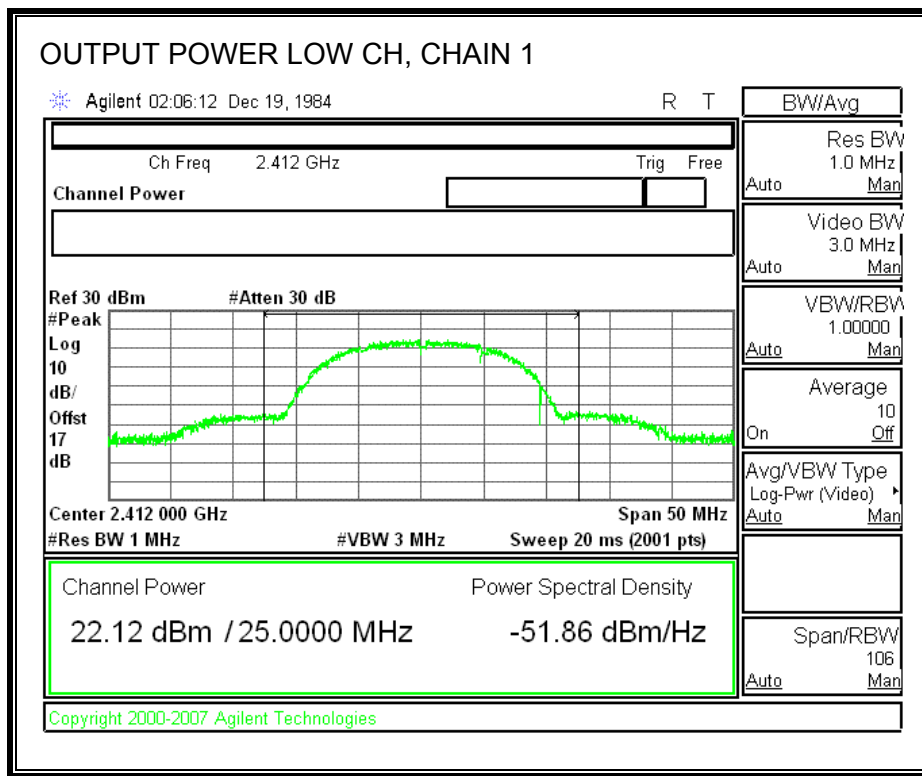
**CHAIN 0 OUTPUT POWER**

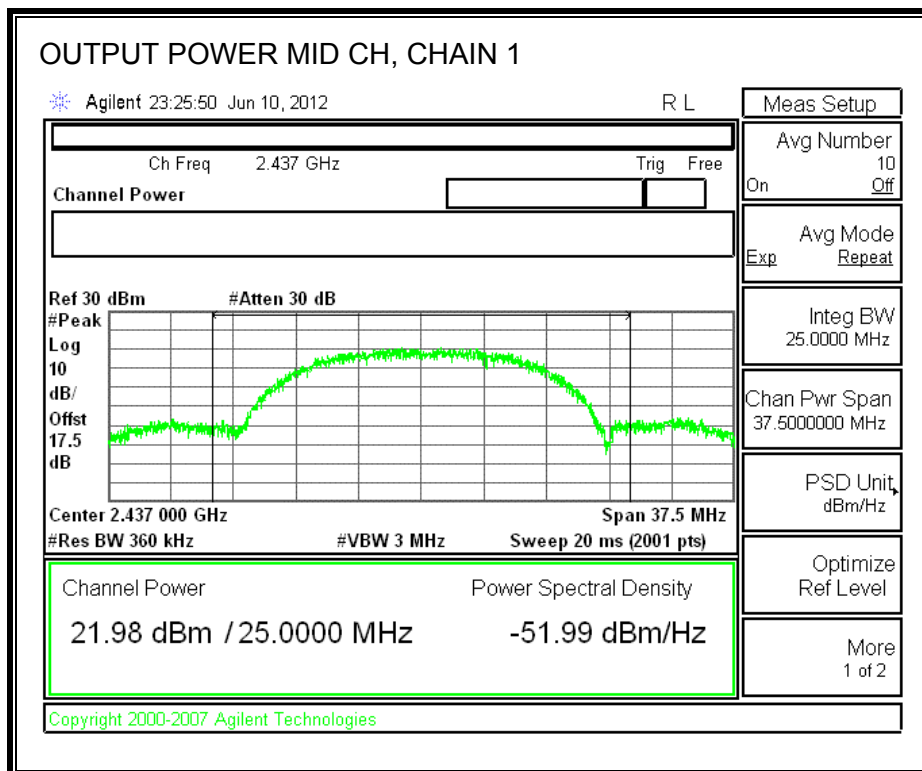


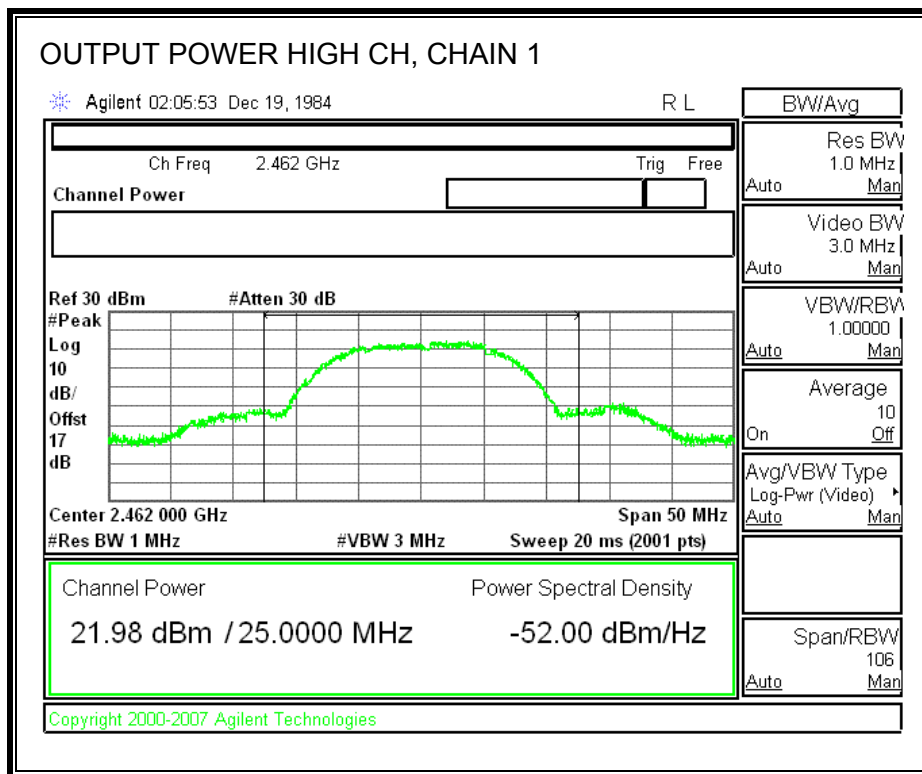




**CHAIN 1 OUTPUT POWER**







#### 7.1.4. AVERAGE POWER

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

The cable assembly insertion loss of 17 dB (including 16 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 2412               | 17.73                  | 17.62                  | 20.69                |
| Middle  | 2437               | 16.81                  | 17.05                  | 19.94                |
| High    | 2462               | 17.91                  | 17.88                  | 20.91                |

## 7.1.5. 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.

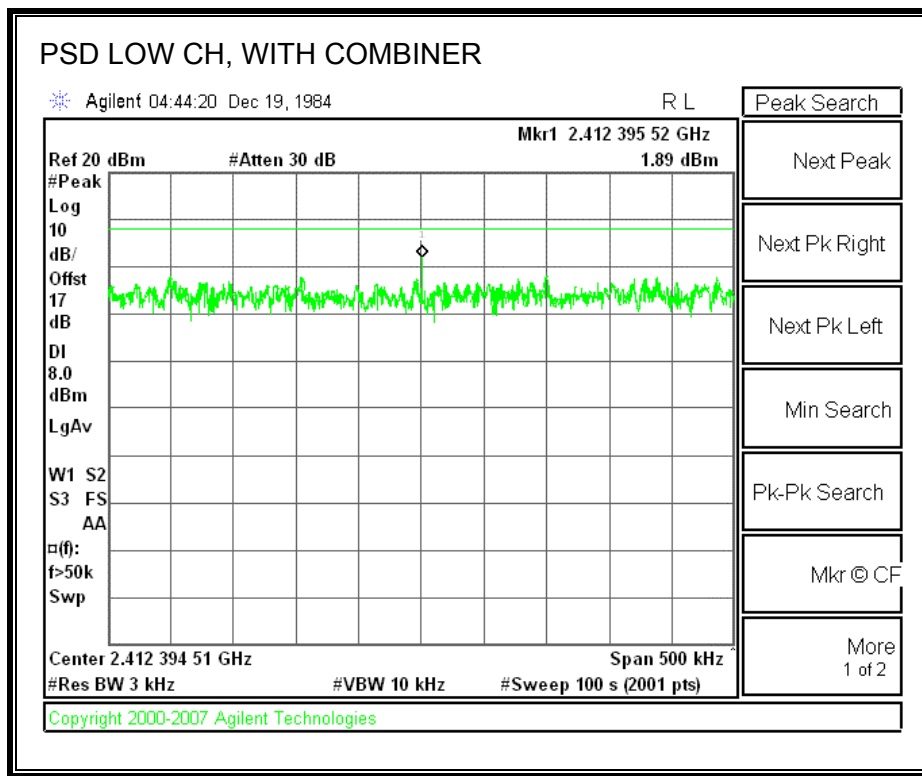
### TEST PROCEDURE

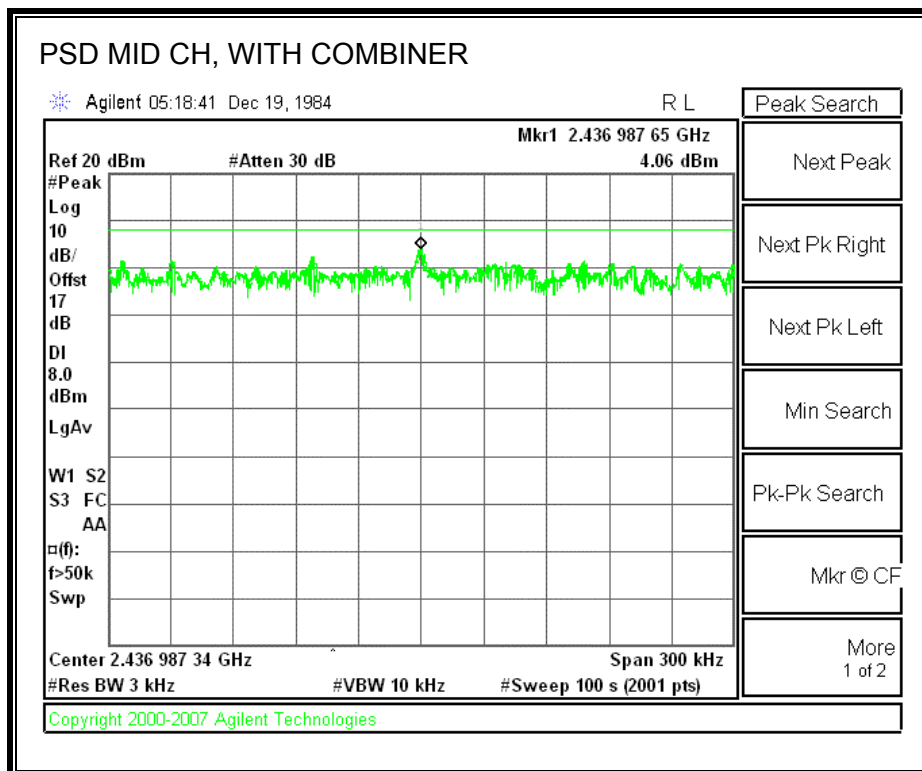
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

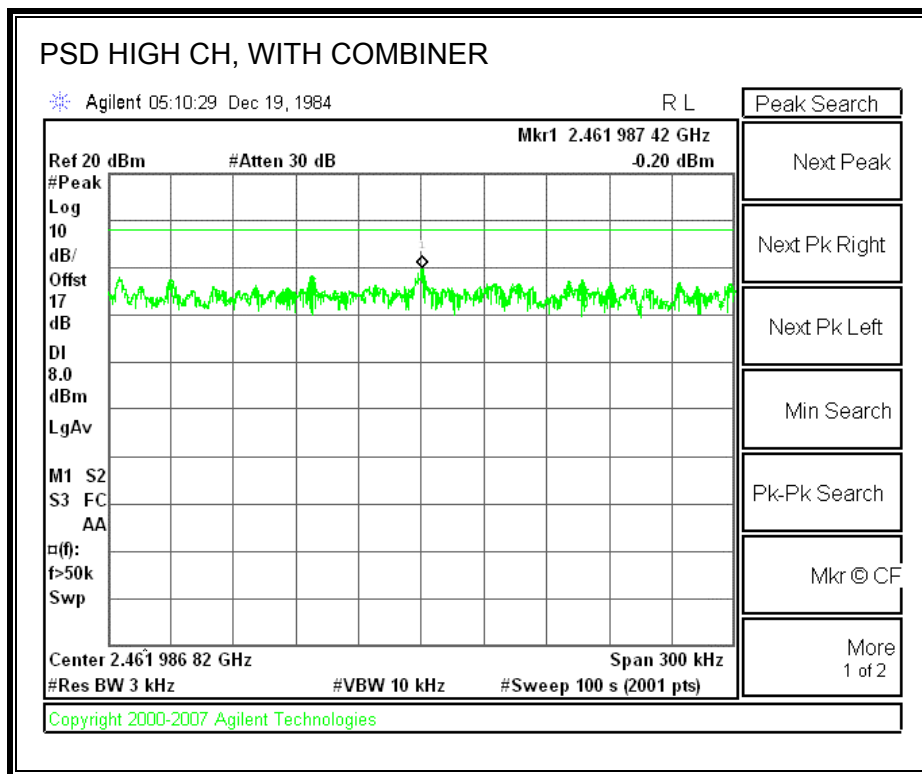
### RESULTS

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 2412               | 1.89                       | 8              | -6.11          |
| Middle  | 2437               | 4.06                       | 8              | -3.94          |
| High    | 2462               | -0.20                      | 8              | -8.20          |

**POWER SPECTRAL DENSITY, WITH COMBINER**







## **7.1.6. 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.

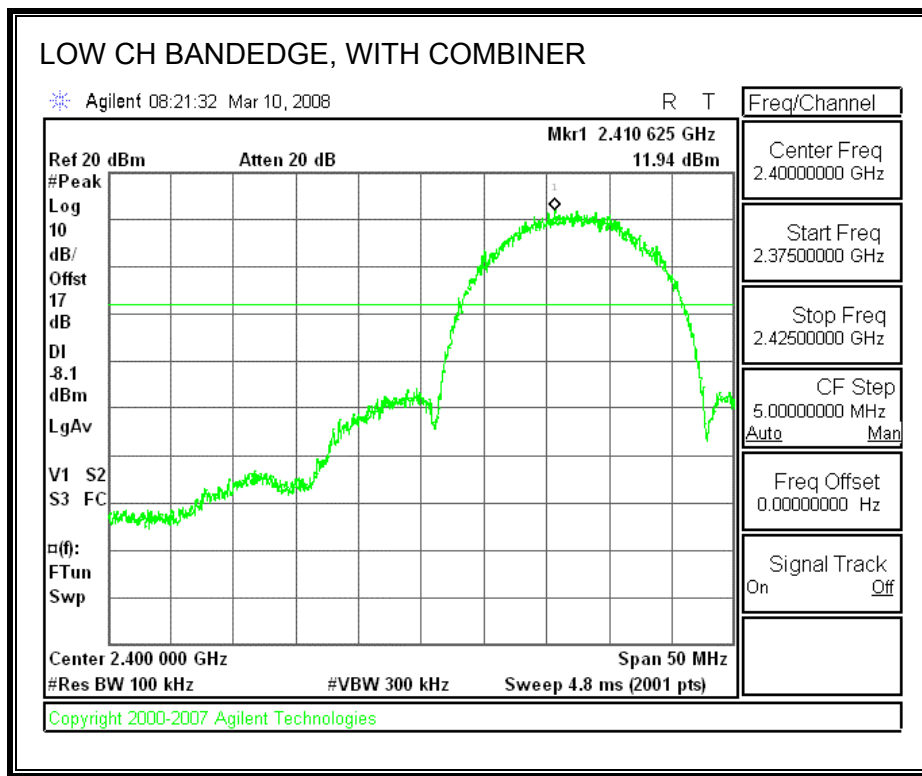
### **TEST PROCEDURE**

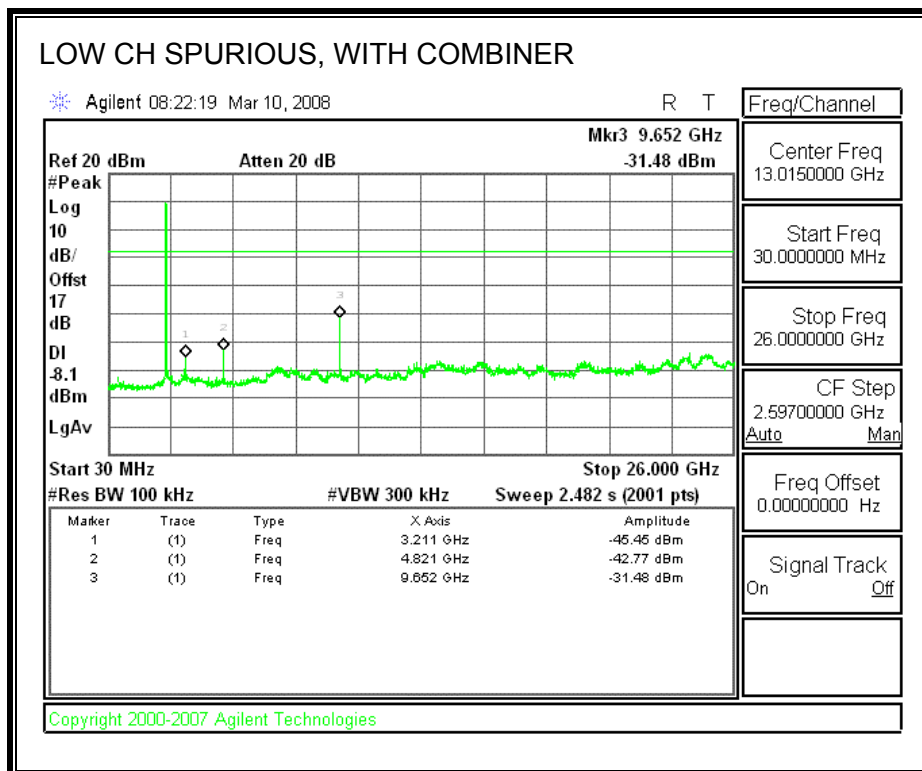
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

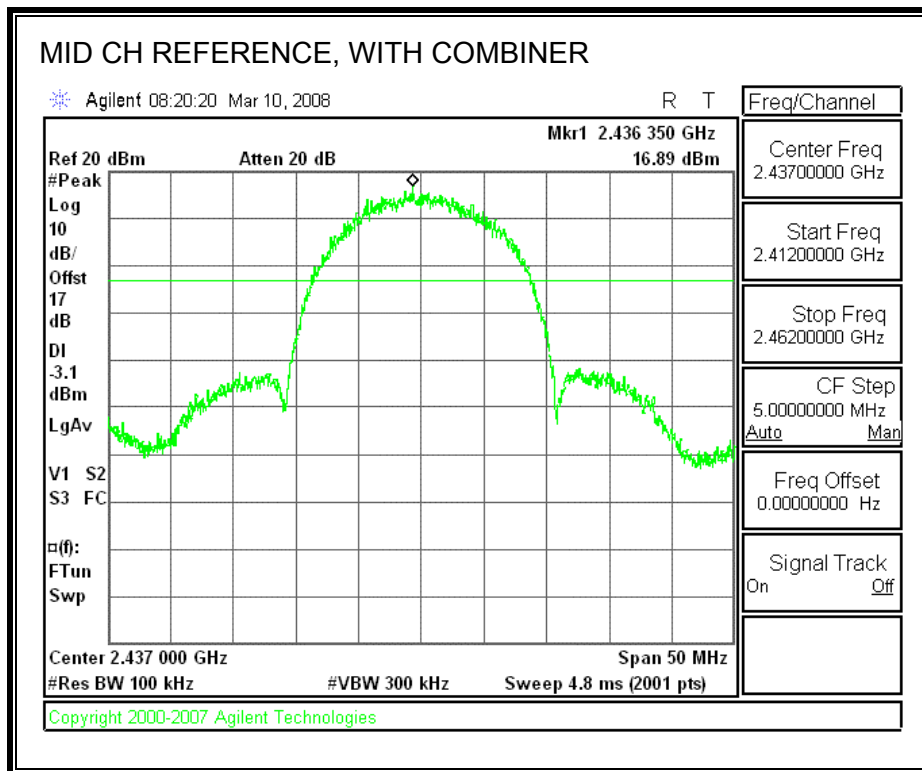
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

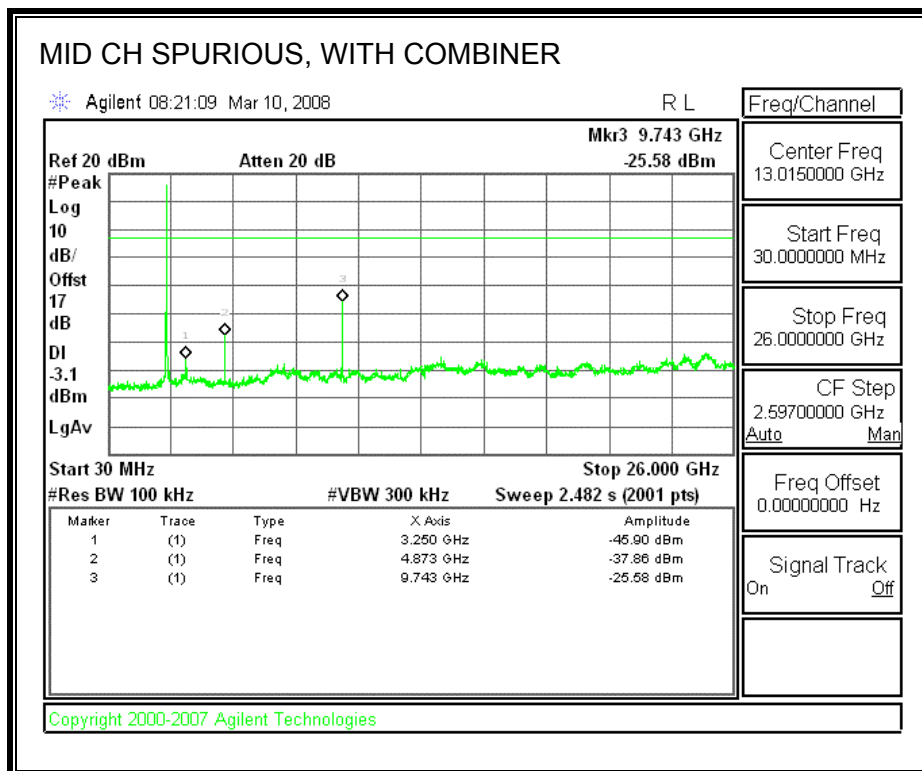
### **RESULTS**

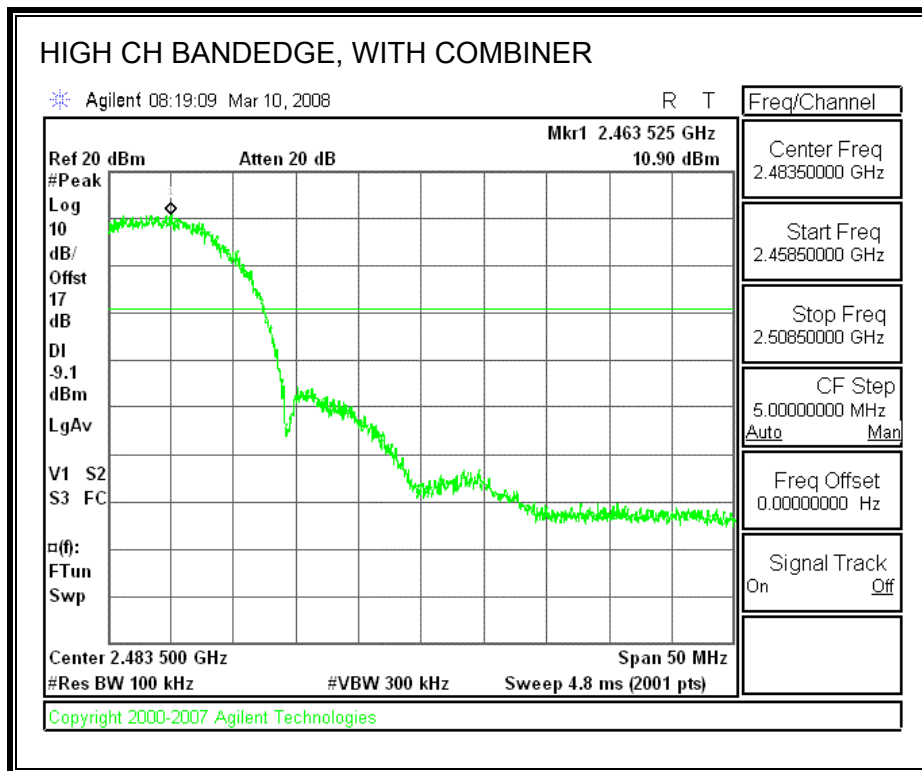
**SPURIOUS EMISSIONS WITH COMBINER**

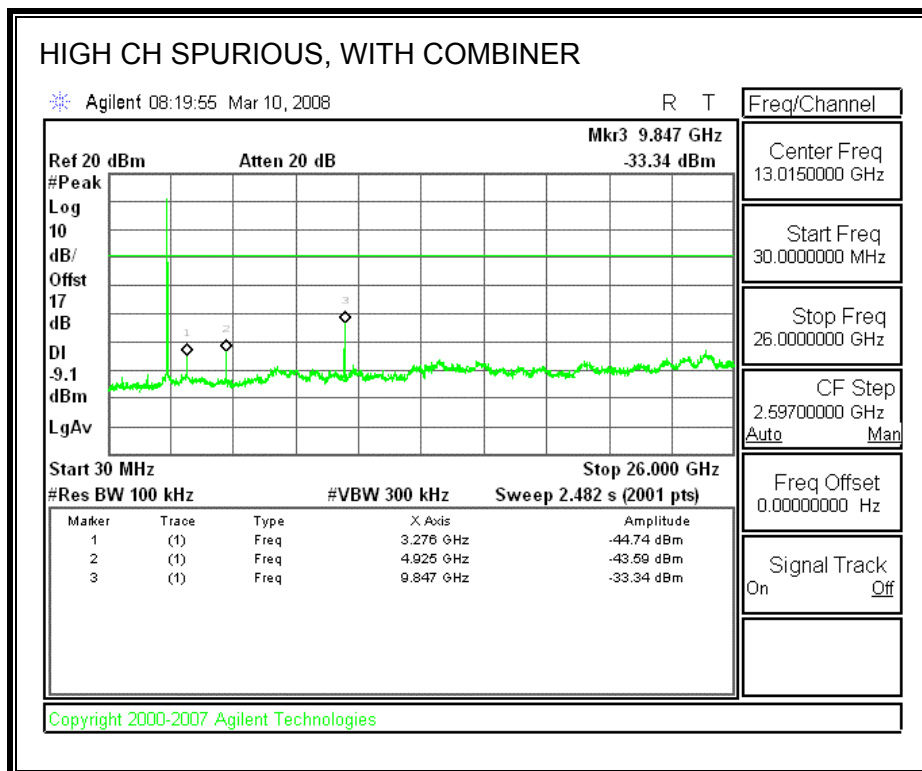












## **7.2. 802.11g DUAL CHAIN LEGACY MODE IN THE 2.4 GHz BAND**

### **7.2.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

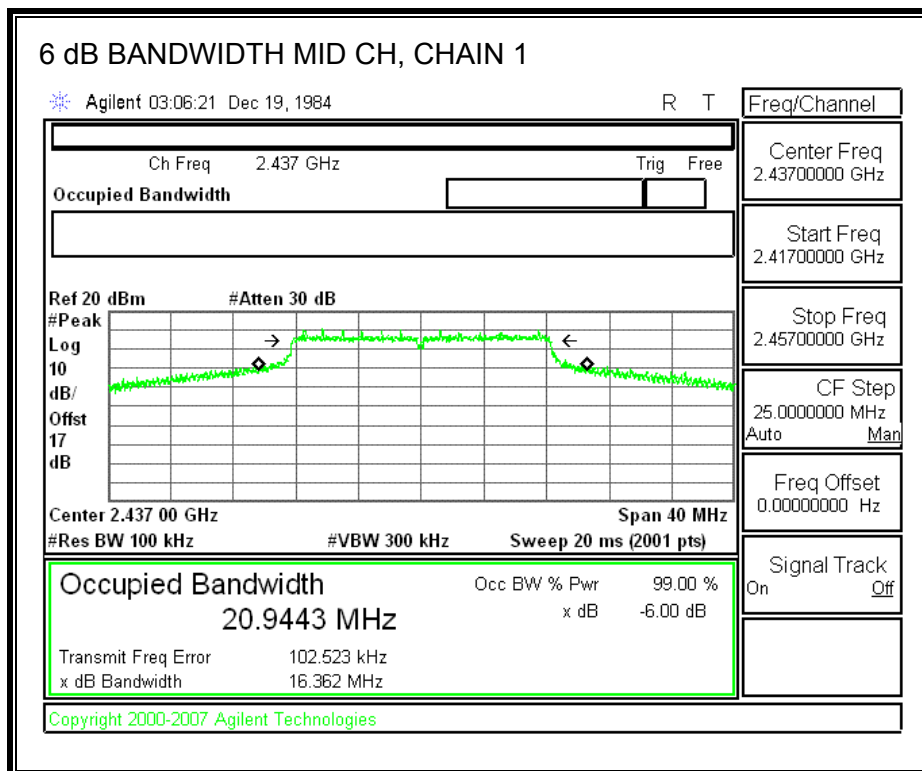
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 2437                       | 16.362                   | 0.5                            |



## 7.2.2. 99% BANDWIDTH

### LIMITS

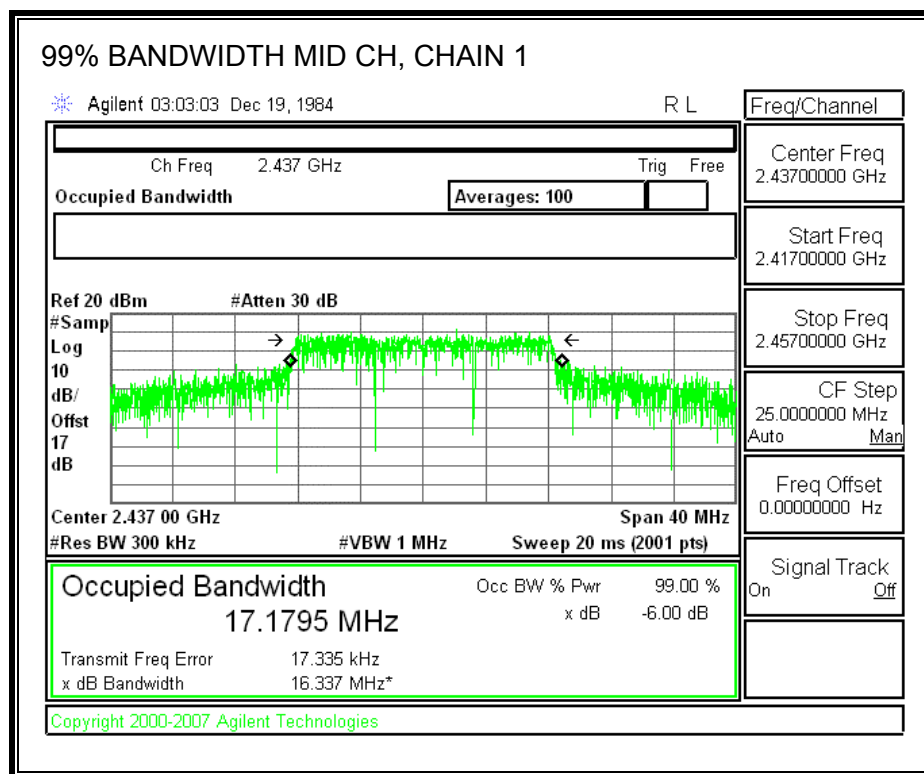
None; for reporting purposes only.

### 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) | Chain 1 (MHz) |
|---------|-----------------|---------------|
| Middle  | 2437            | 17.1795       |



### 7.2.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

| Effective Legacy Gain<br>(dBi) |
|--------------------------------|
| 6.33                           |

The maximum antenna gain is 6.33 dBi for P-To-M; therefore the limit is 29.67 dBm.

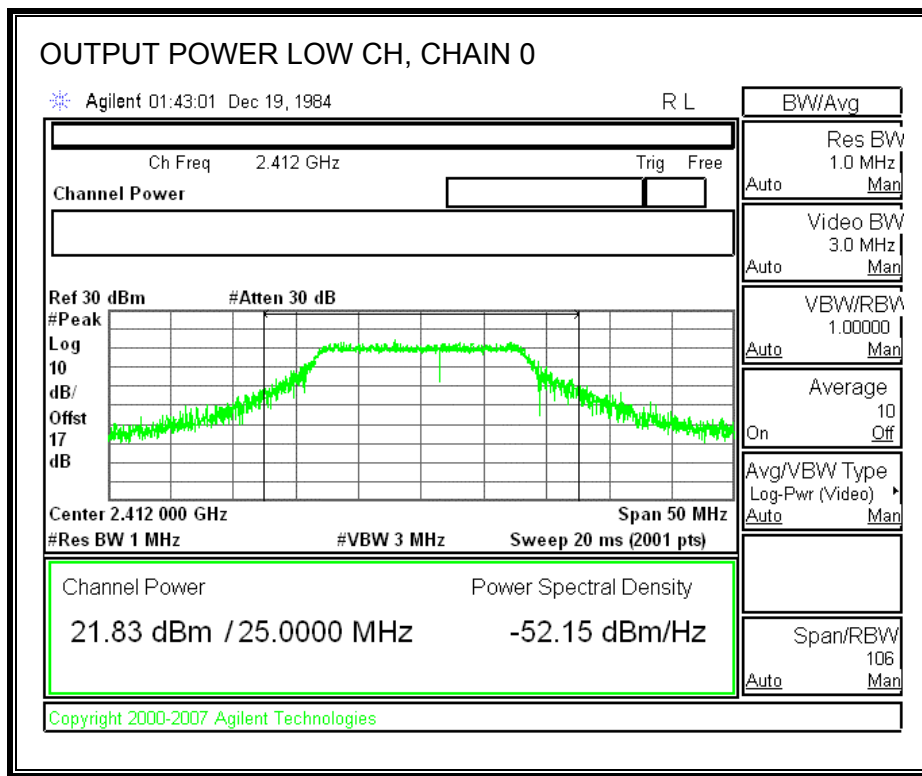
#### TEST PROCEDURE

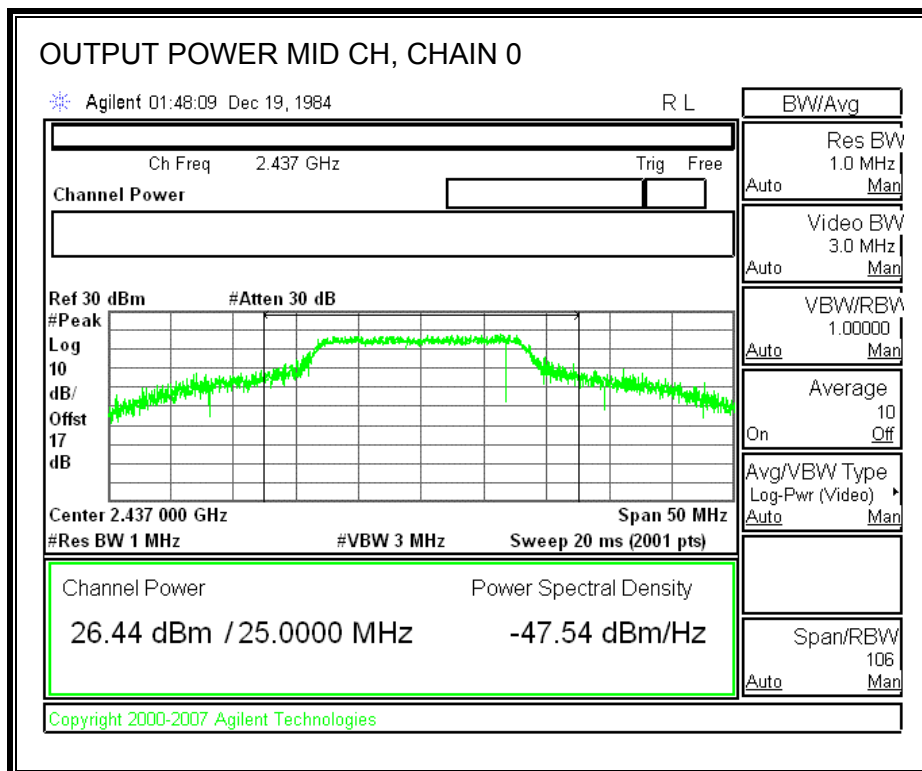
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

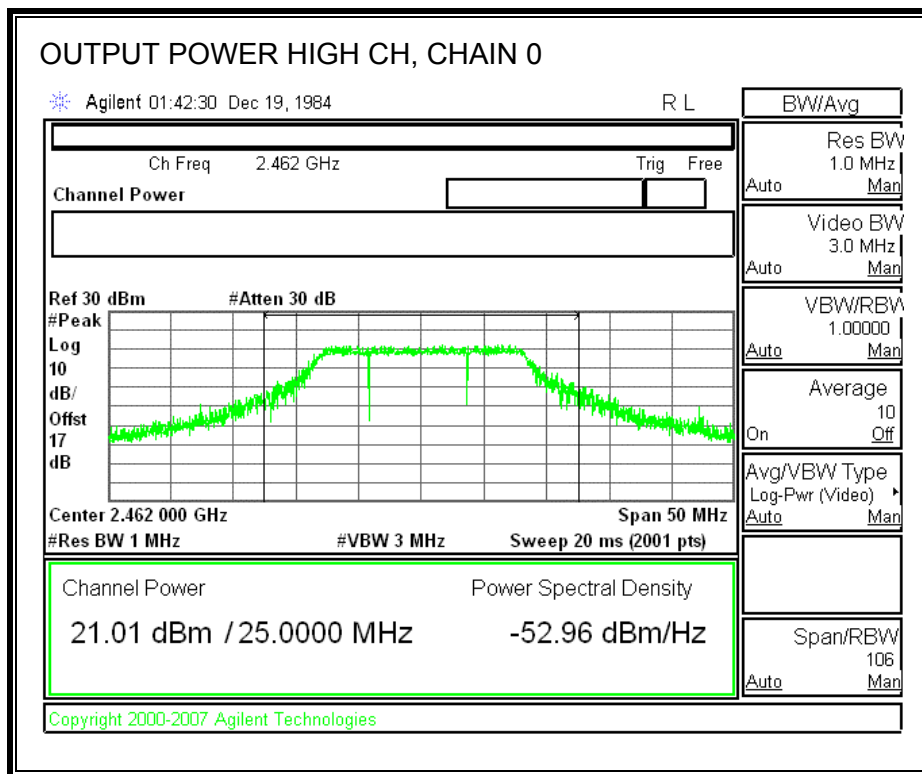
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 2412               | 29.67          | 21.83                     | 20.43                     | 24.20                   | -5.47          |
| Mid     | 2437               | 29.67          | 26.44                     | 26.69                     | 29.58                   | -0.09          |
| High    | 2462               | 29.67          | 21.01                     | 21.11                     | 24.07                   | -5.60          |

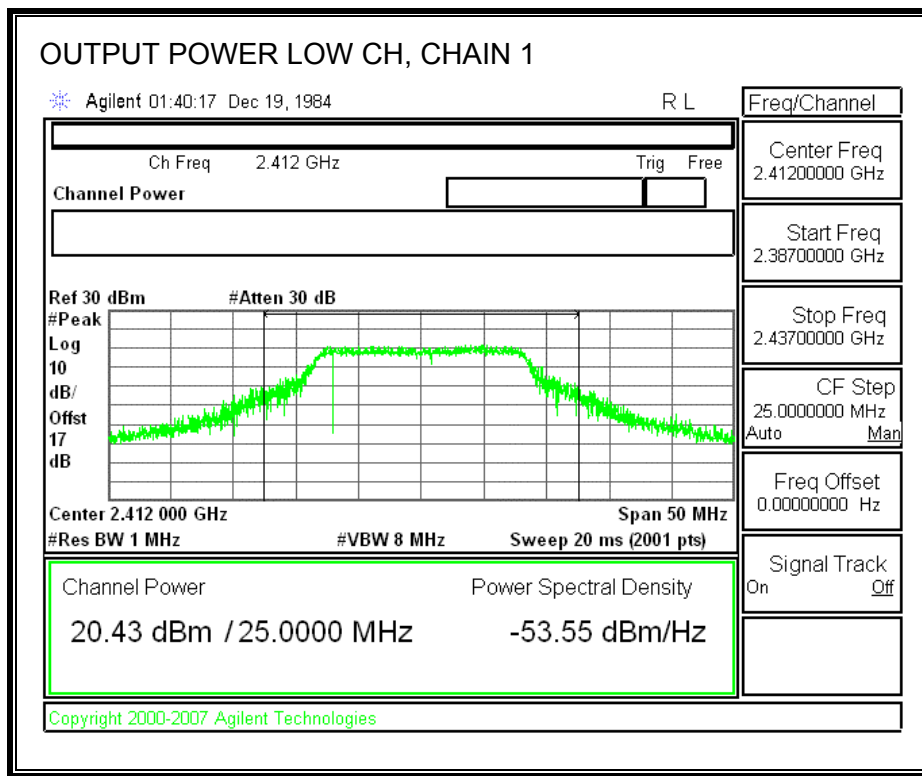
**CHAIN 0 OUTPUT POWER**

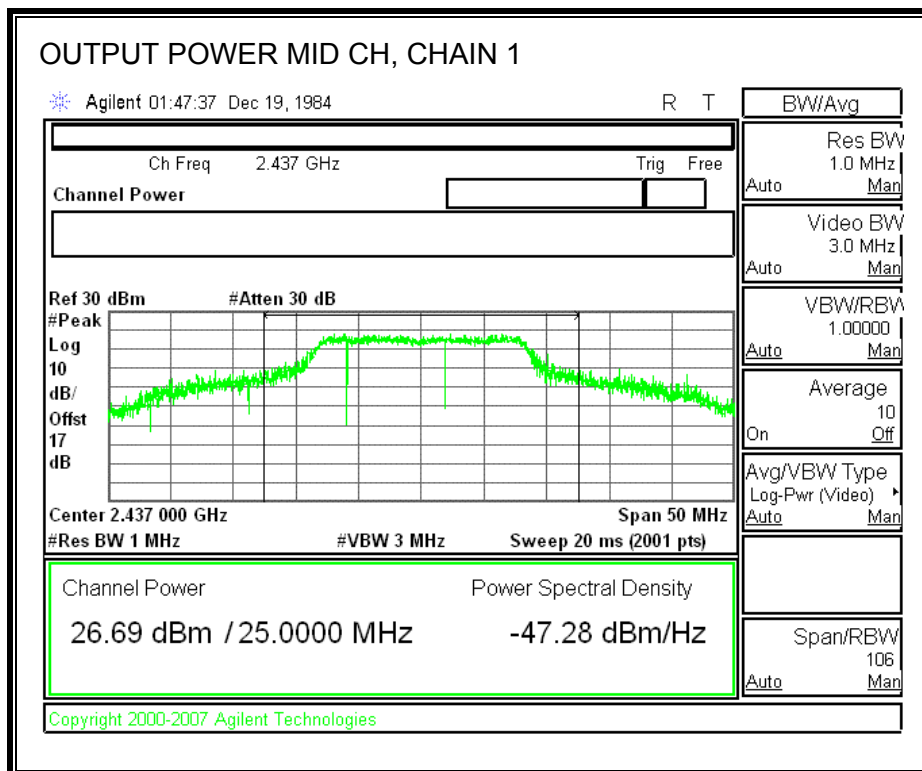


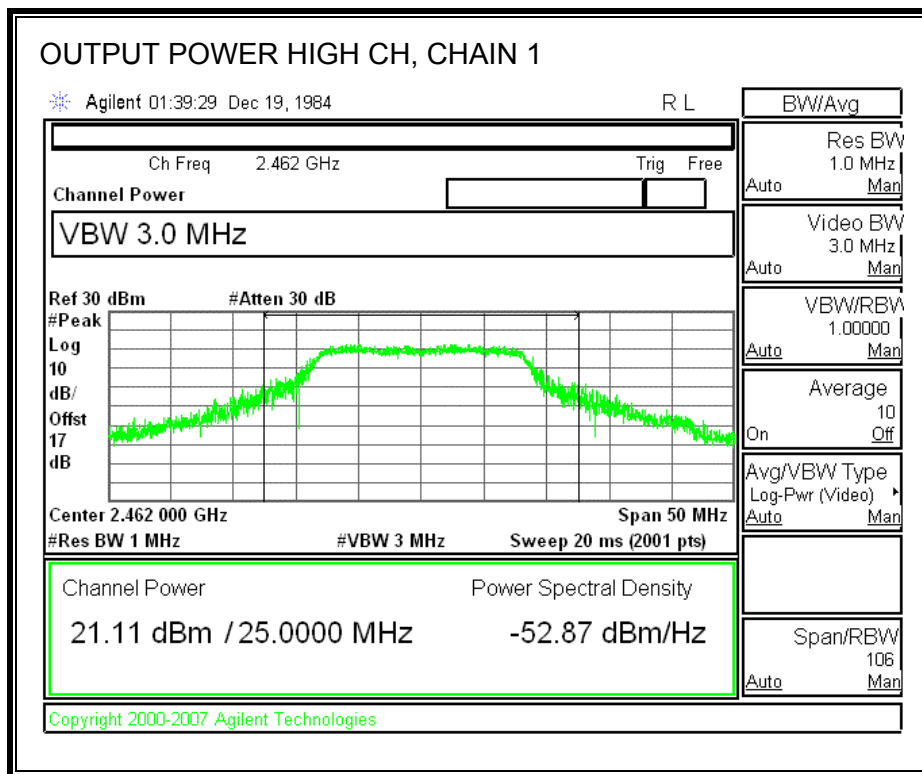




**CHAIN 1 OUTPUT POWER**







## 7.2.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss of 17 dB (including 16 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 2412               | 16.27                  | 15.23                  | 18.79                |
| Middle  | 2437               | 21.29                  | 21.35                  | 24.33                |
| High    | 2462               | 15.83                  | 15.91                  | 18.88                |

## 7.2.5. 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.

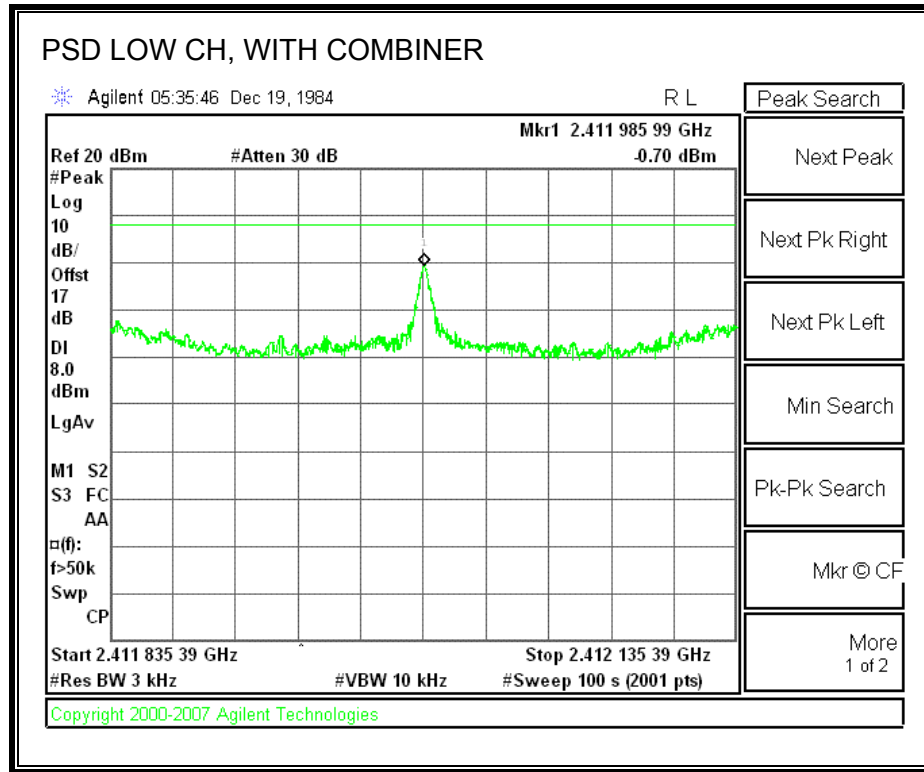
### TEST PROCEDURE

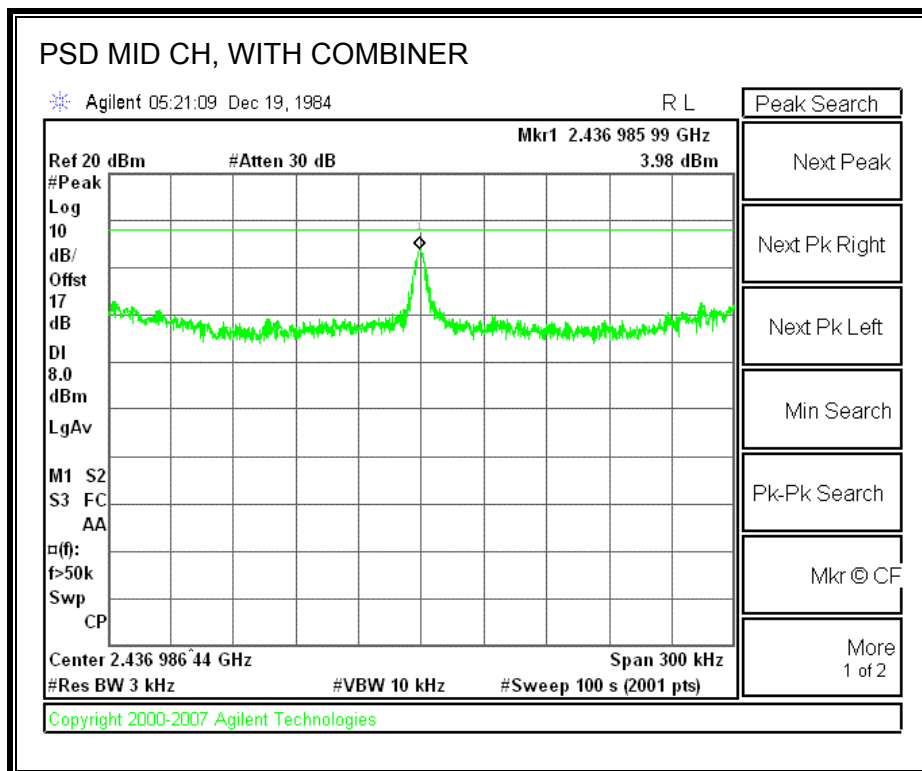
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

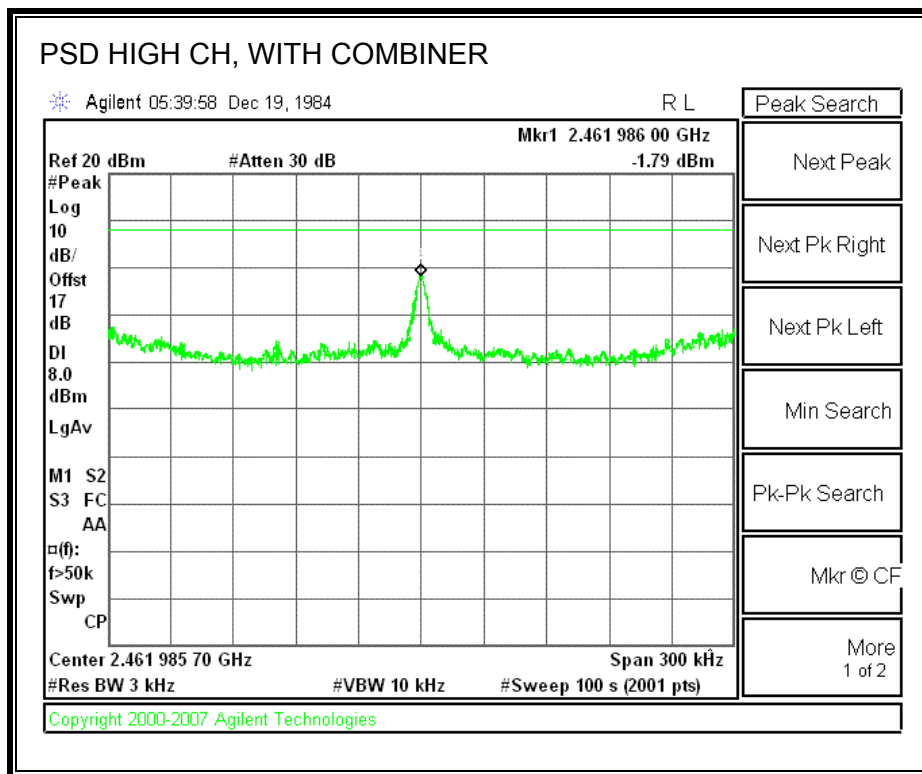
### RESULTS

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 2412               | -0.70                      | 8              | -8.70          |
| Middle  | 2437               | 3.98                       | 8              | -4.02          |
| High    | 2462               | -1.79                      | 8              | -9.79          |

**POWER SPECTRAL DENSITY, WITH COMBINER**







## **7.2.6. 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.

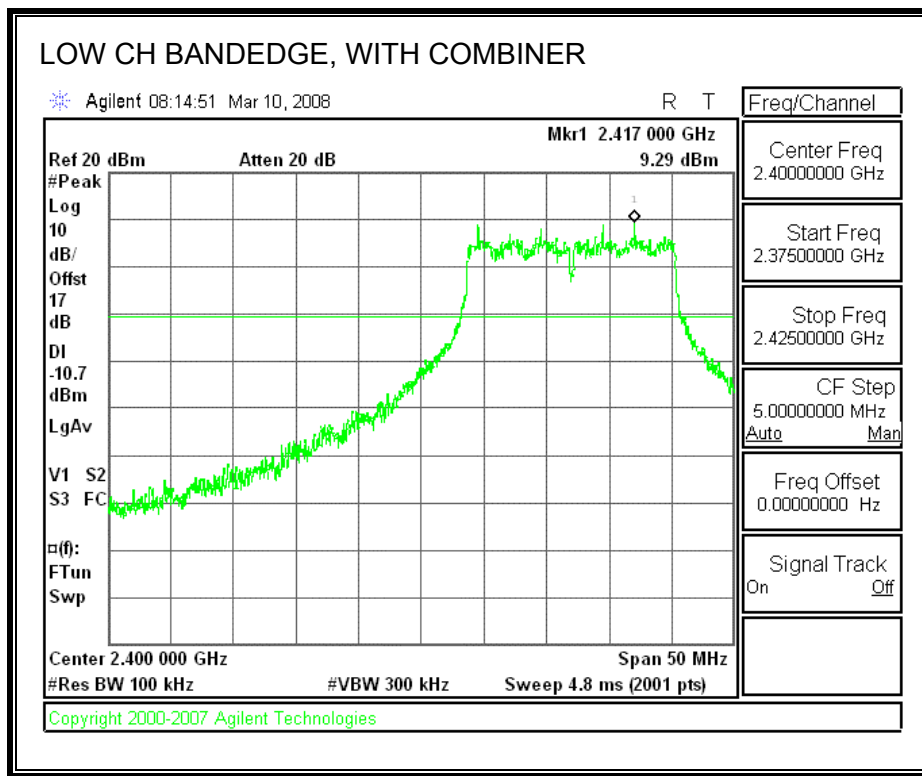
### **TEST PROCEDURE**

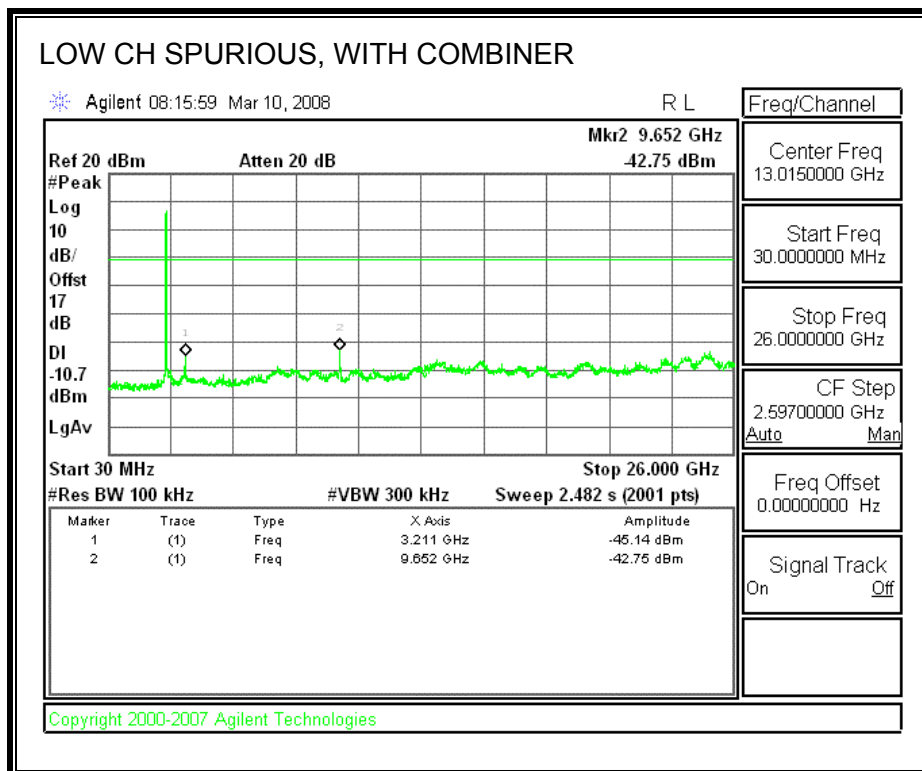
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

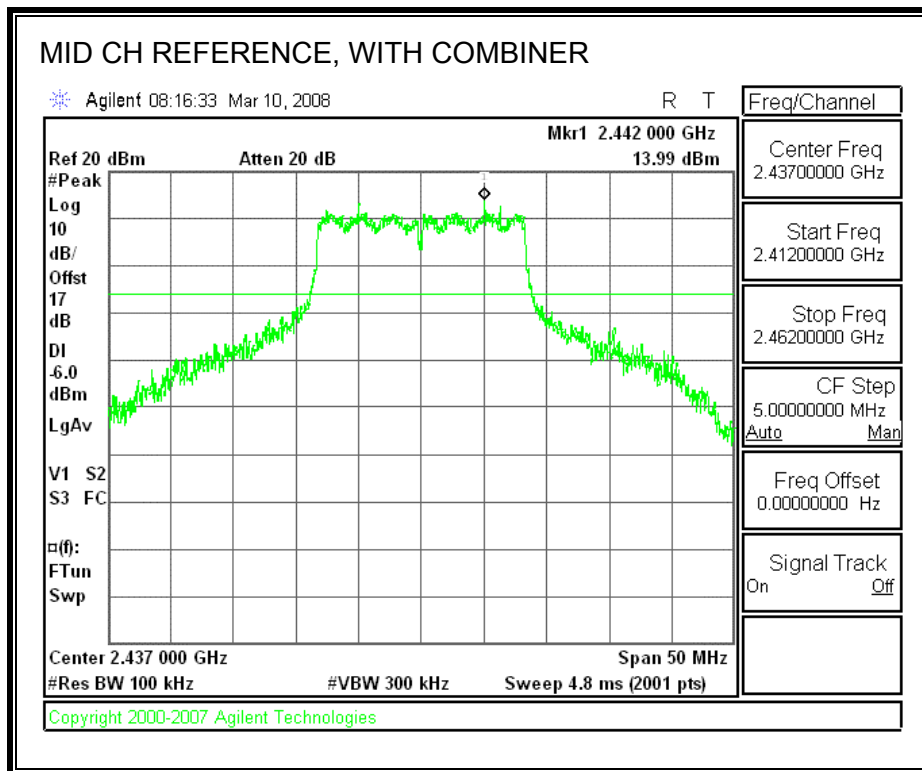
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

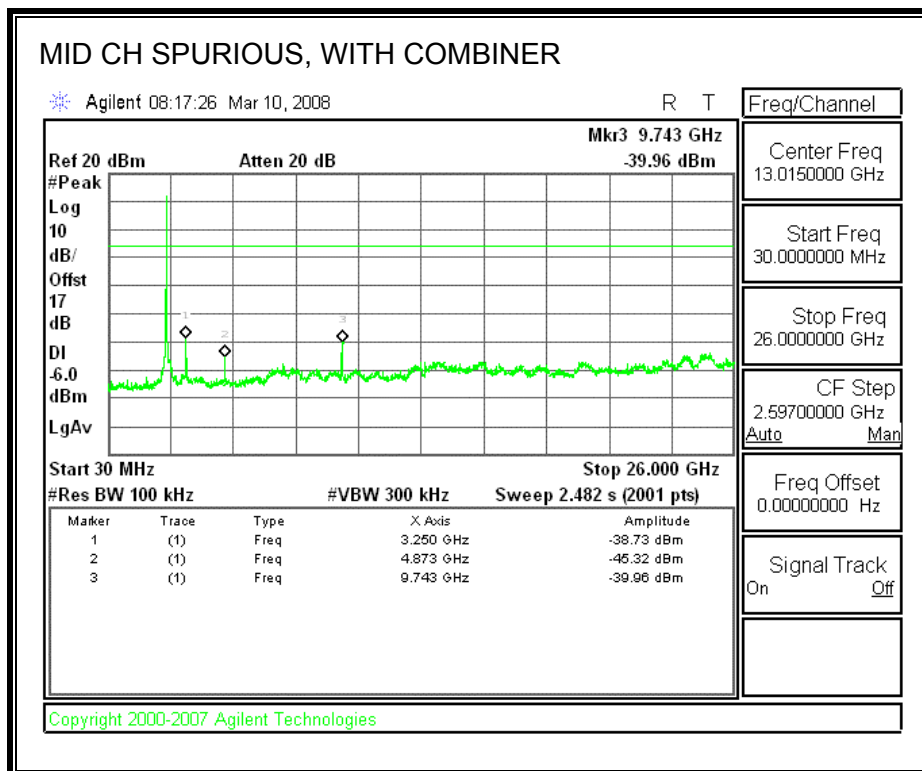
### **RESULTS**

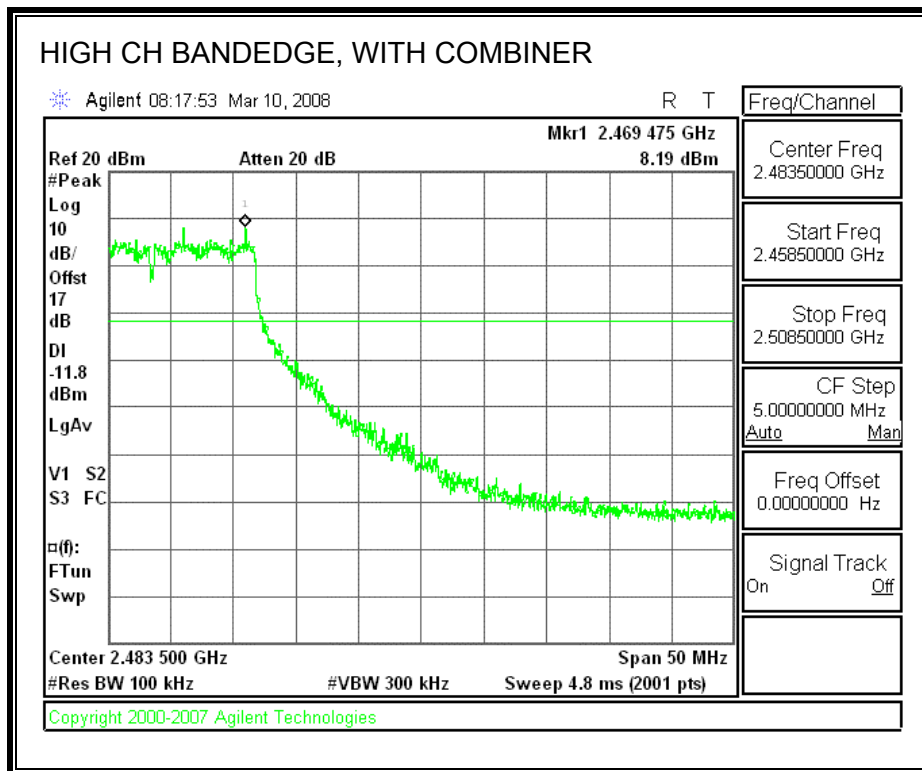
# SPURIOUS EMISSIONS WITH COMBINER

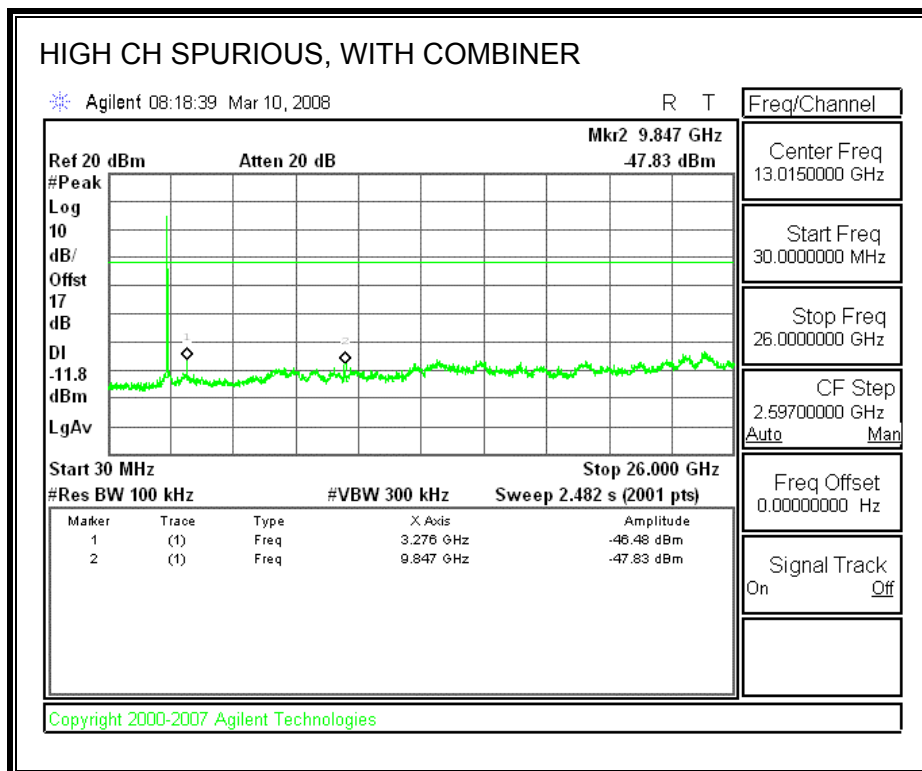












### **7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND**

#### **7.3.1. 6 dB BANDWIDTH**

##### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

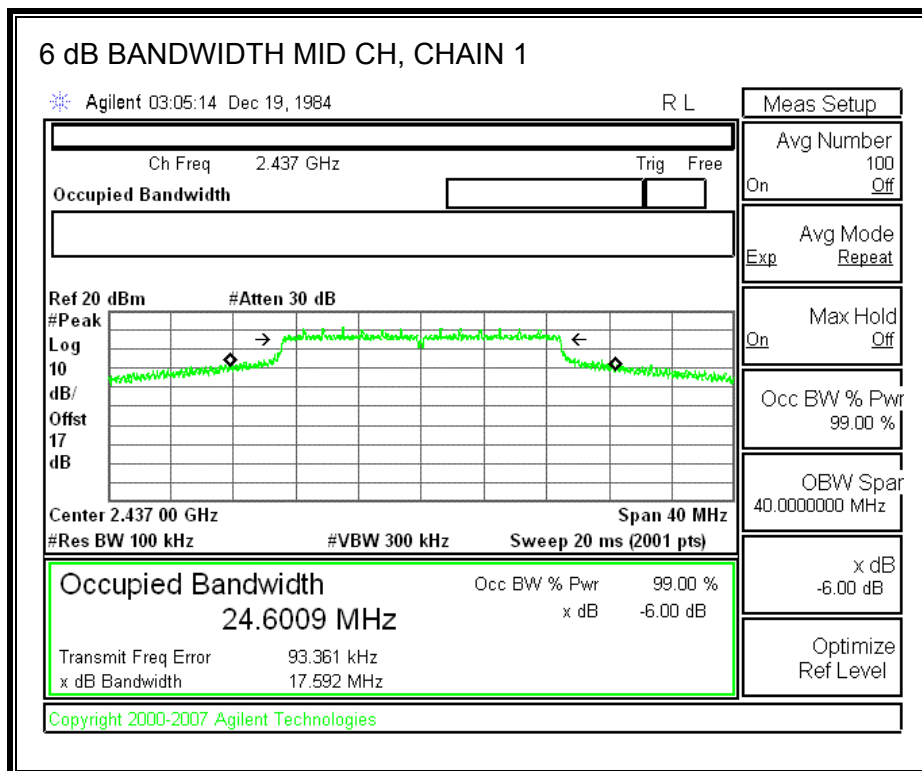
The minimum 6 dB bandwidth shall be at least 500 kHz.

##### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 2437                       | 17.592                   | 0.5                            |



### 7.3.2. 99% BANDWIDTH

#### LIMITS

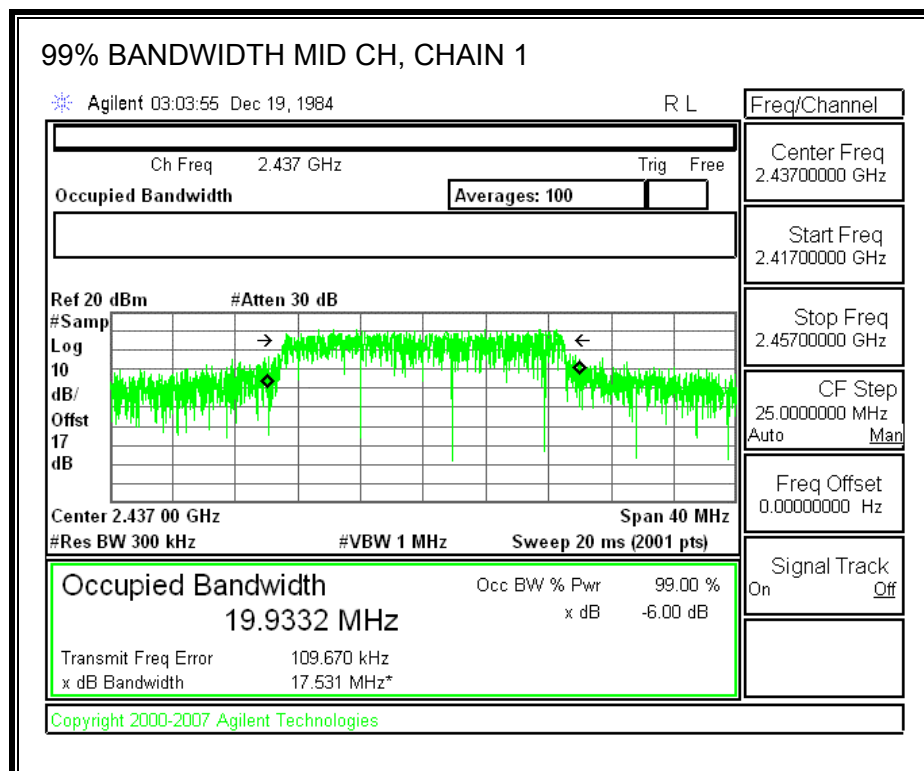
None; for reporting purposes only.

#### 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<br>(MHz) | Chain 1<br>(MHz) |
|---------|--------------------|------------------|
| Middle  | 2437               | 19.9332          |



### 7.3.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

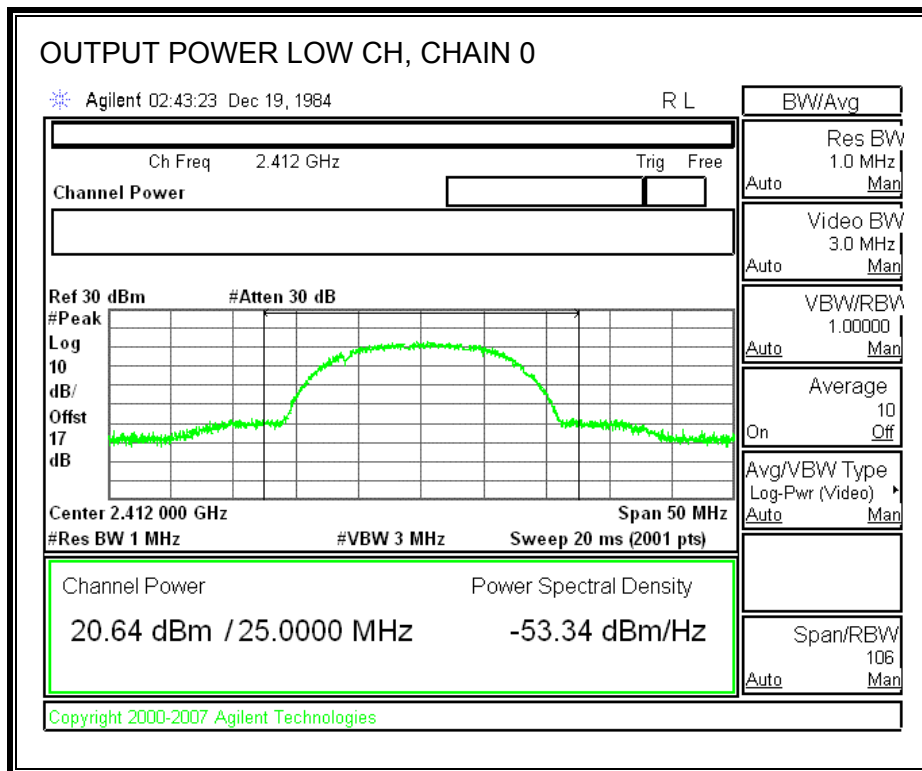
#### TEST PROCEDURE

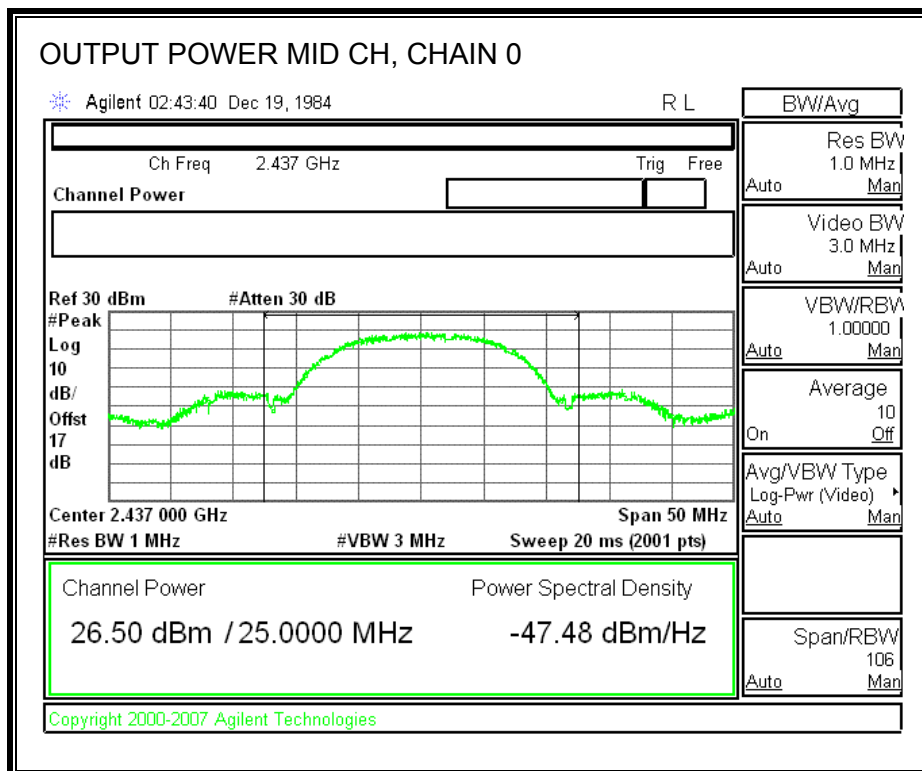
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

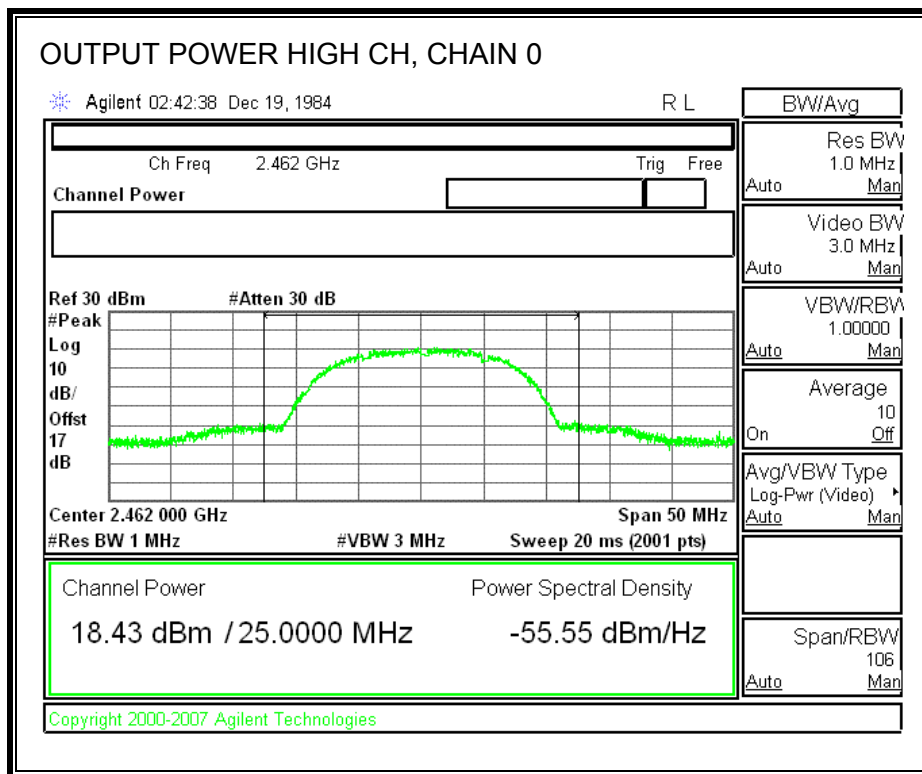
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 2412               | 30.00          | 20.64                     | 19.79                     | 23.25                   | -6.75          |
| Mid     | 2437               | 30.00          | 26.50                     | 26.55                     | 29.54                   | -0.46          |
| High    | 2462               | 30.00          | 18.43                     | 18.72                     | 21.59                   | -8.41          |

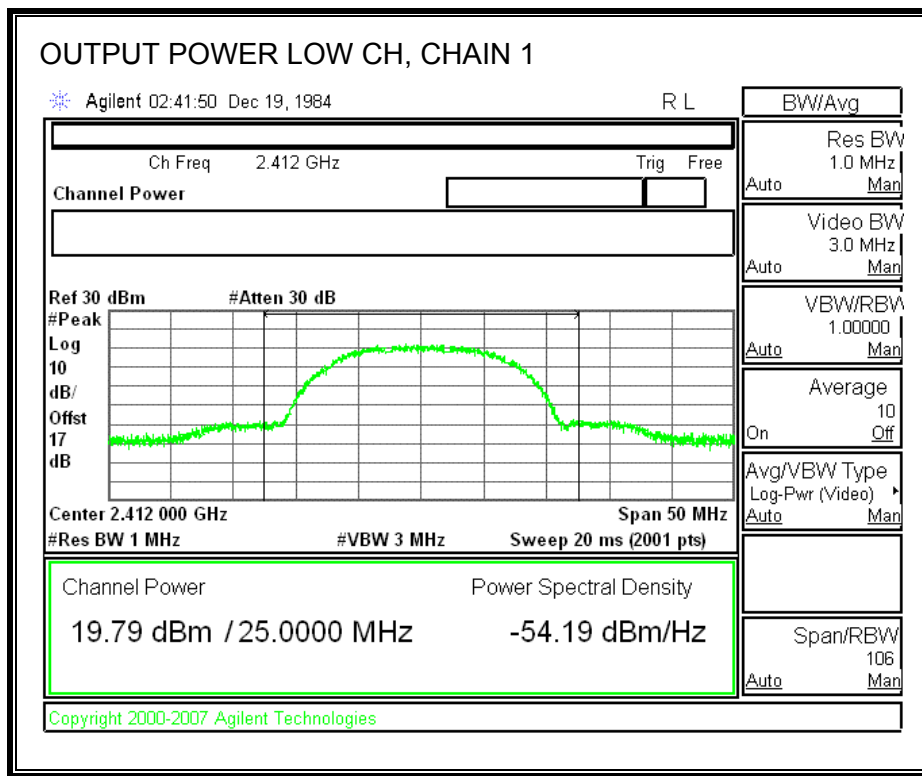
CHAIN 0 OUTPUT POWER

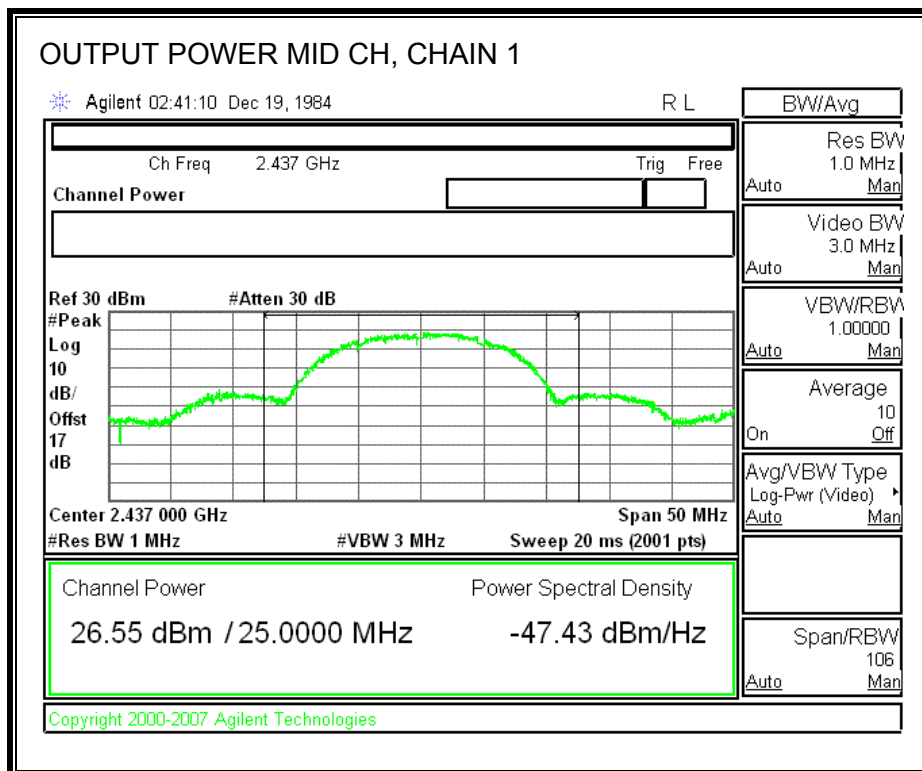


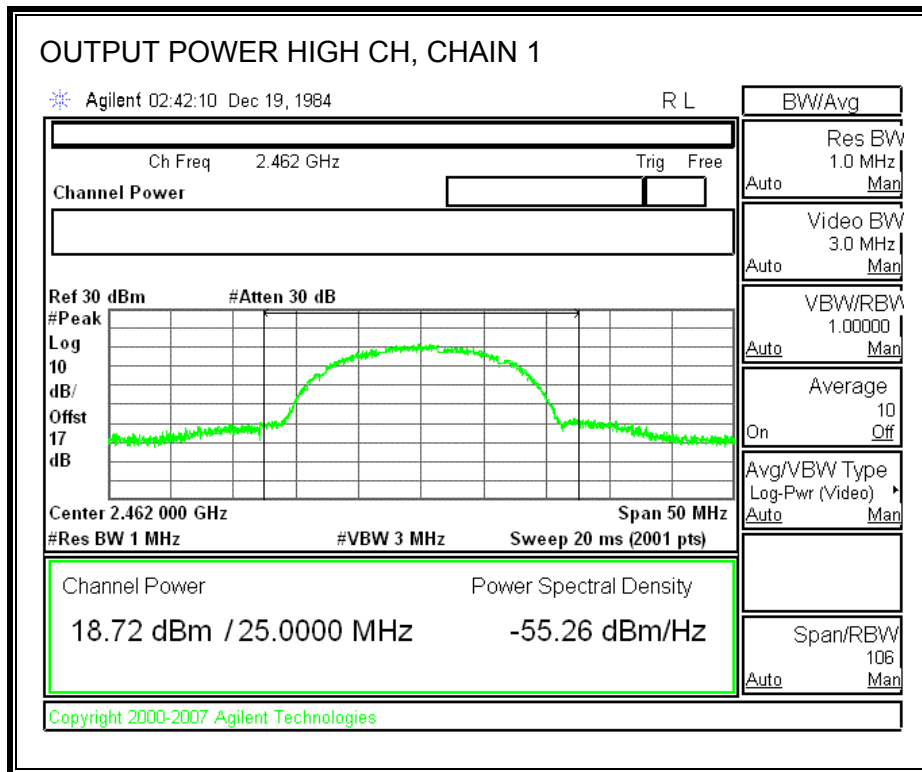




# **CHAIN 1 OUTPUT POWER**







### 7.3.4. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 17 dB (including 16 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 2412               | 15.99                  | 15.47                  | 18.75                |
| Middle  | 2437               | 21.96                  | 22.01                  | 25.00                |
| High    | 2462               | 14.09                  | 14.11                  | 17.11                |

### 7.3.5. 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.

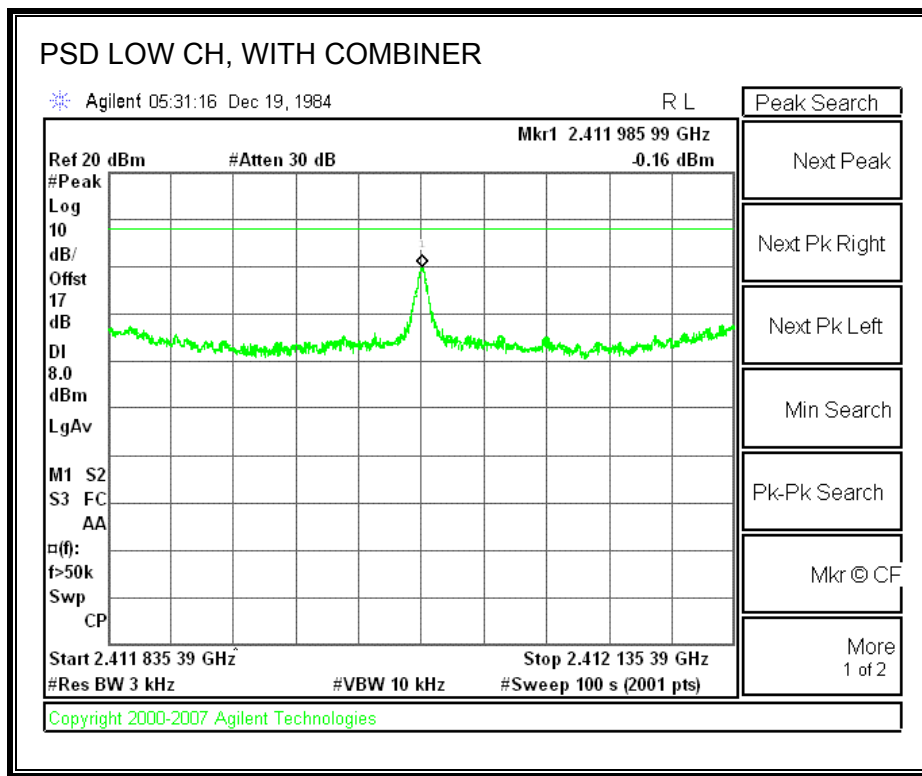
#### TEST PROCEDURE

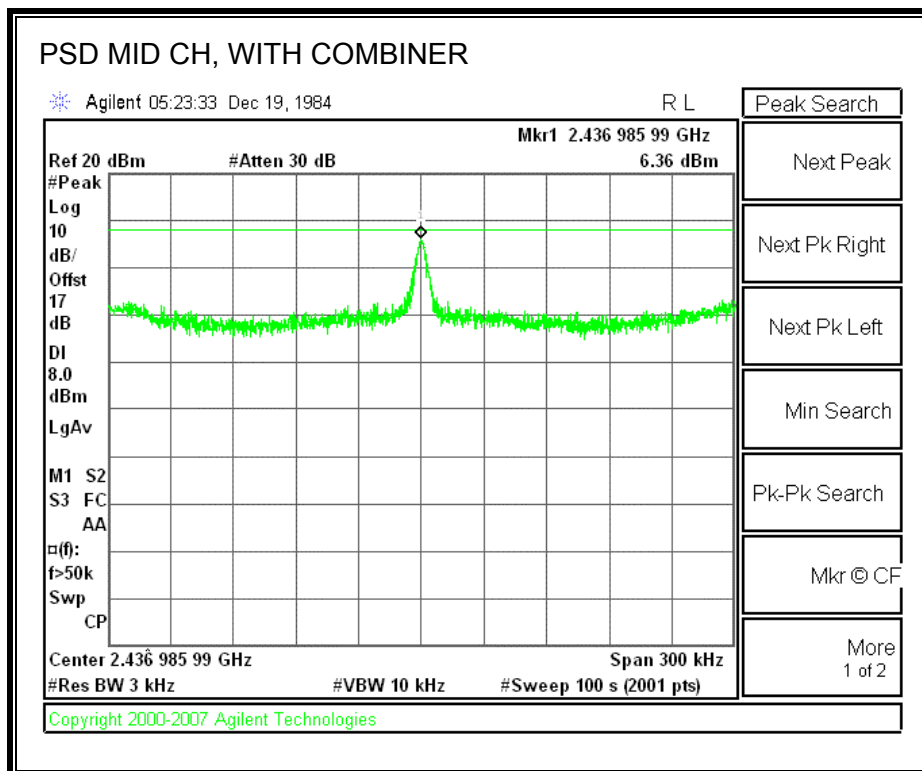
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

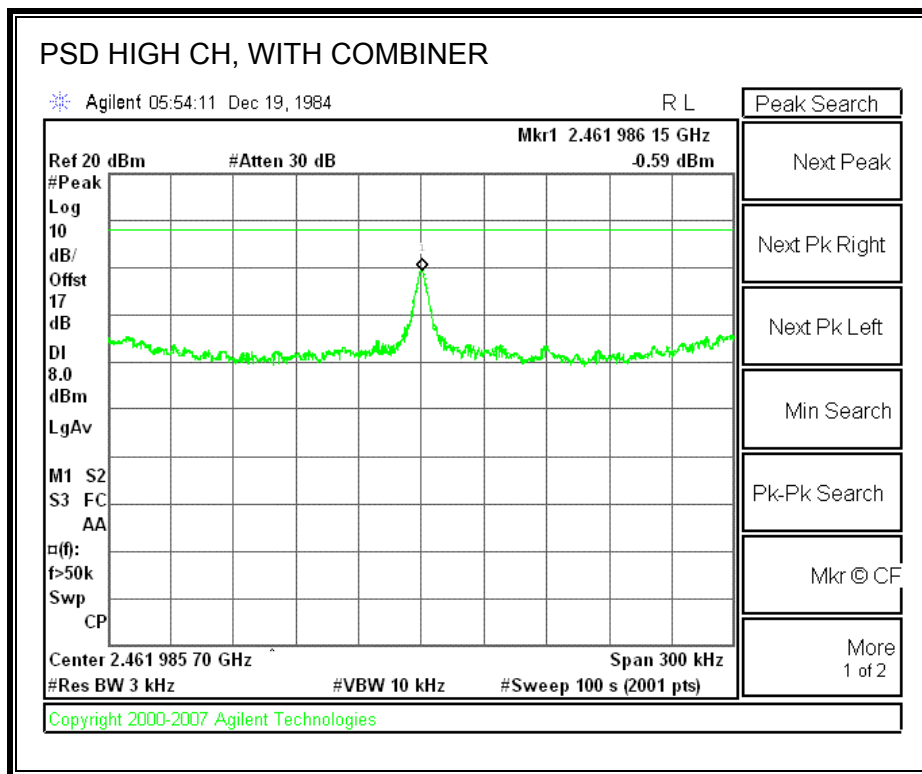
#### RESULTS

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 2412               | -0.16                      | 8              | -8.16          |
| Middle  | 2437               | 6.39                       | 8              | -1.61          |
| High    | 2462               | -0.59                      | 8              | -8.59          |

**POWER SPECTRAL DENSITY, WITH COMBINER**







### **7.3.6. 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.

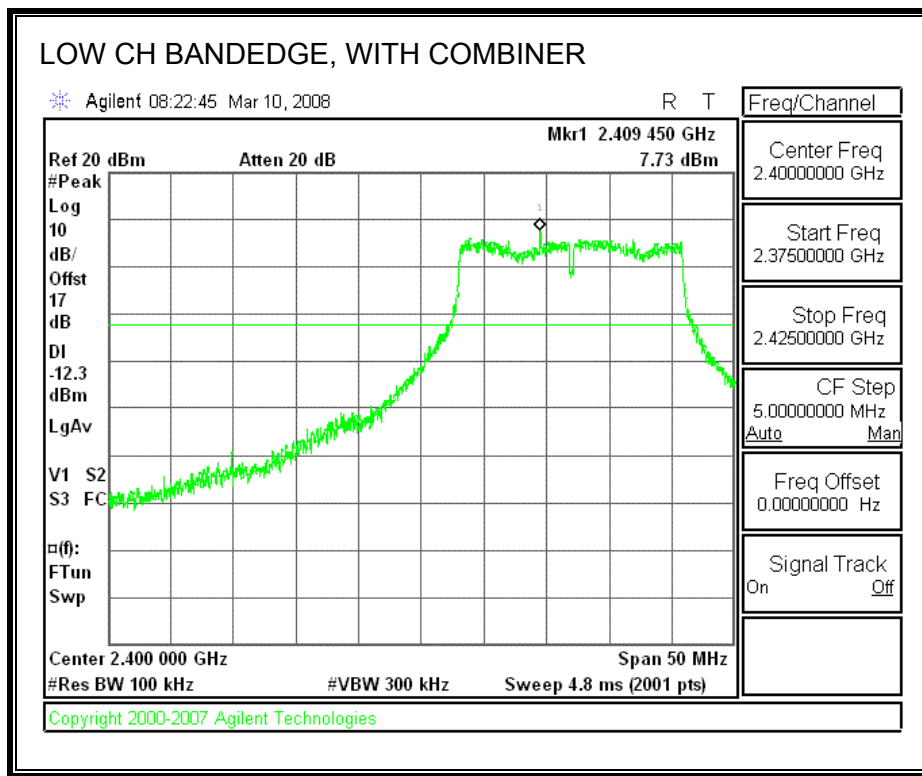
#### **TEST PROCEDURE**

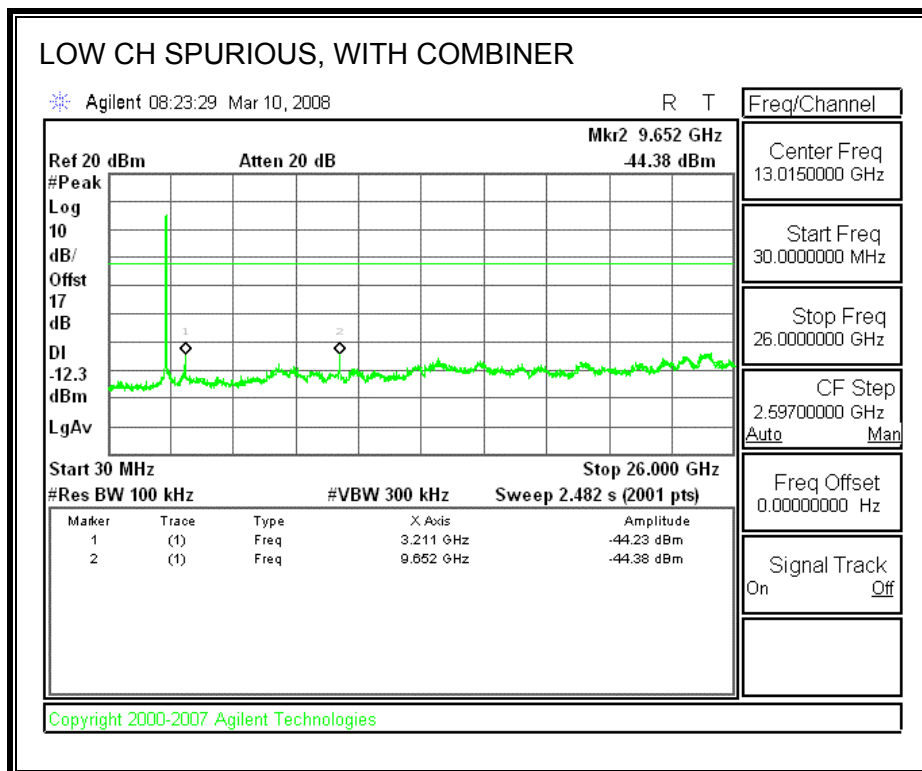
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

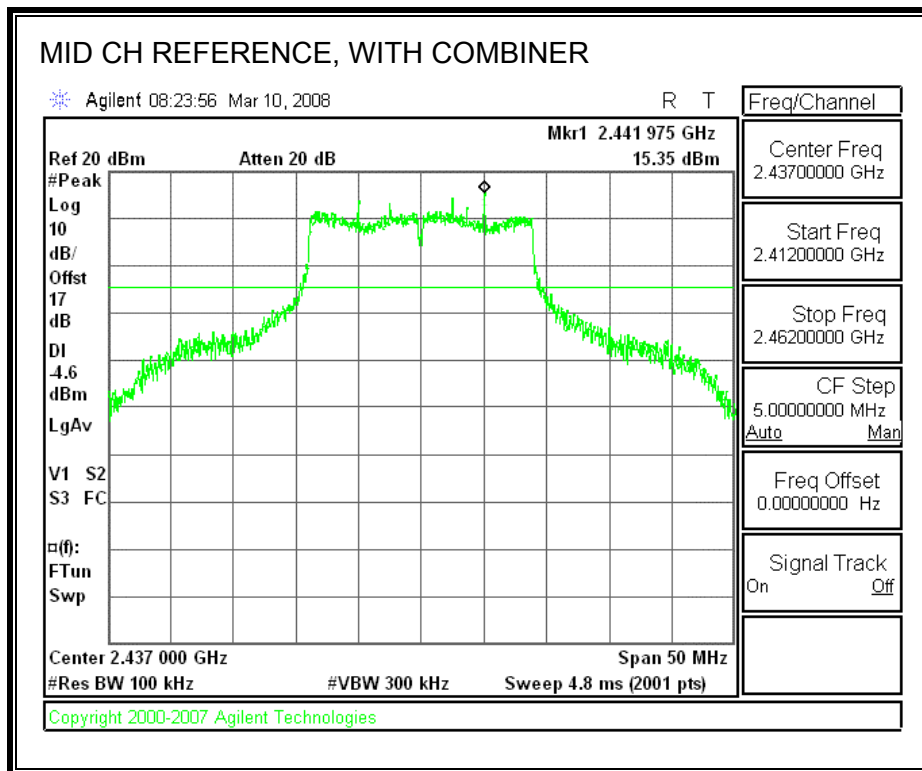
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

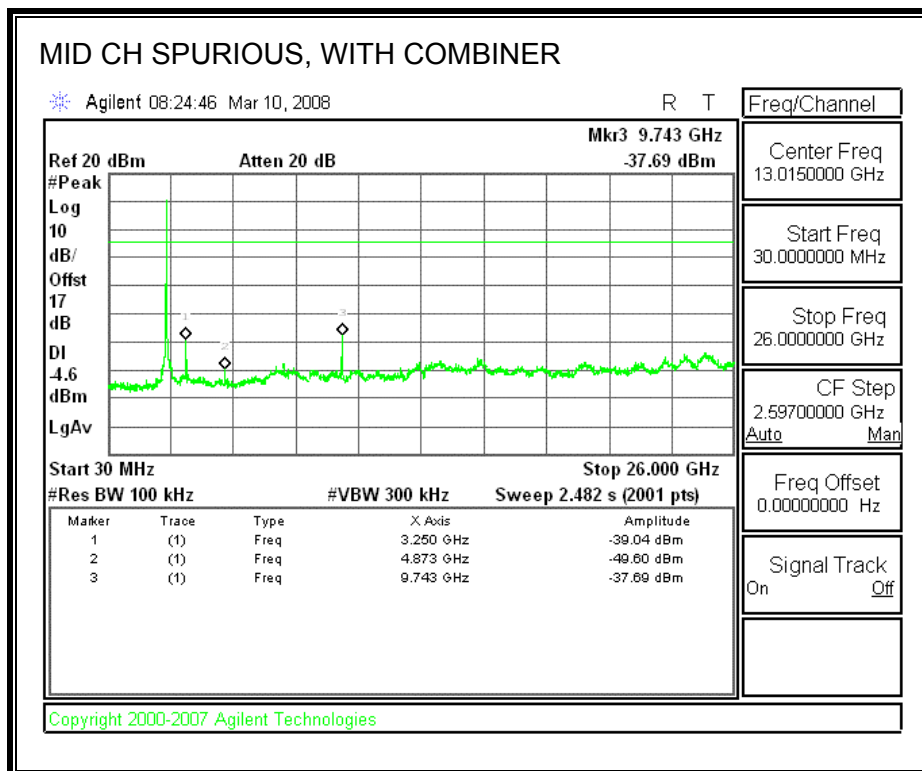
#### **RESULTS**

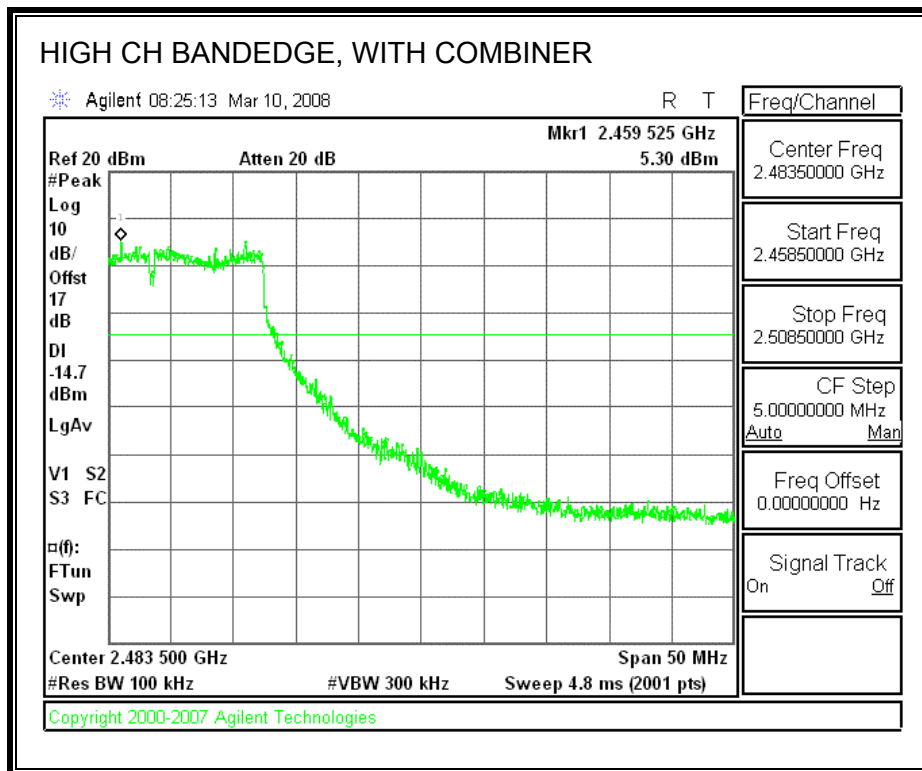
**SPURIOUS EMISSIONS WITH COMBINER**

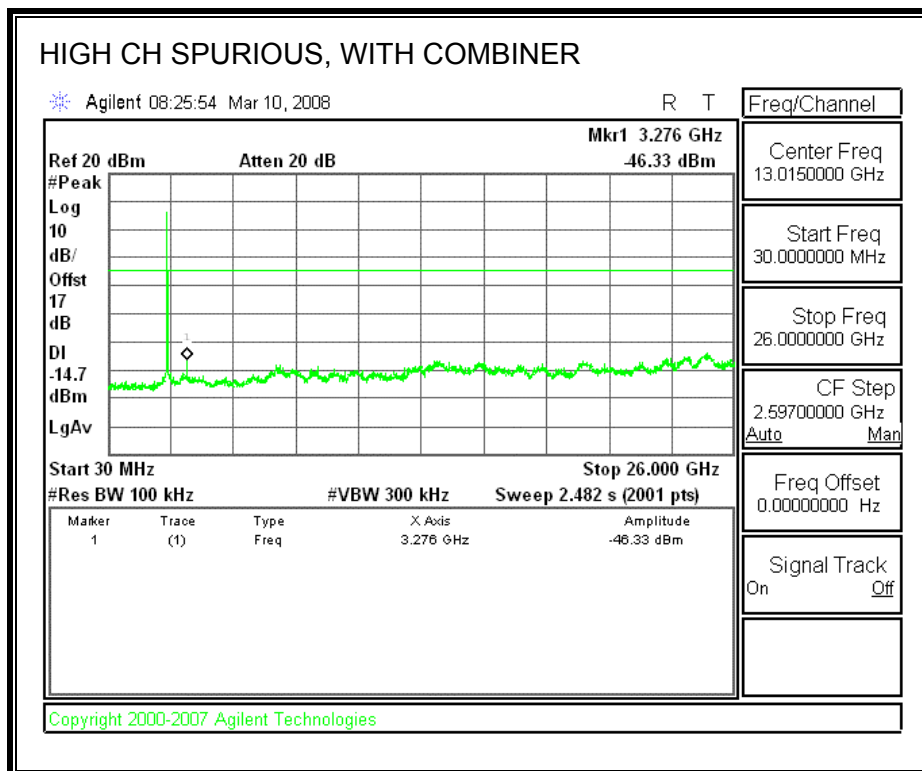












## **7.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND**

### **7.4.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

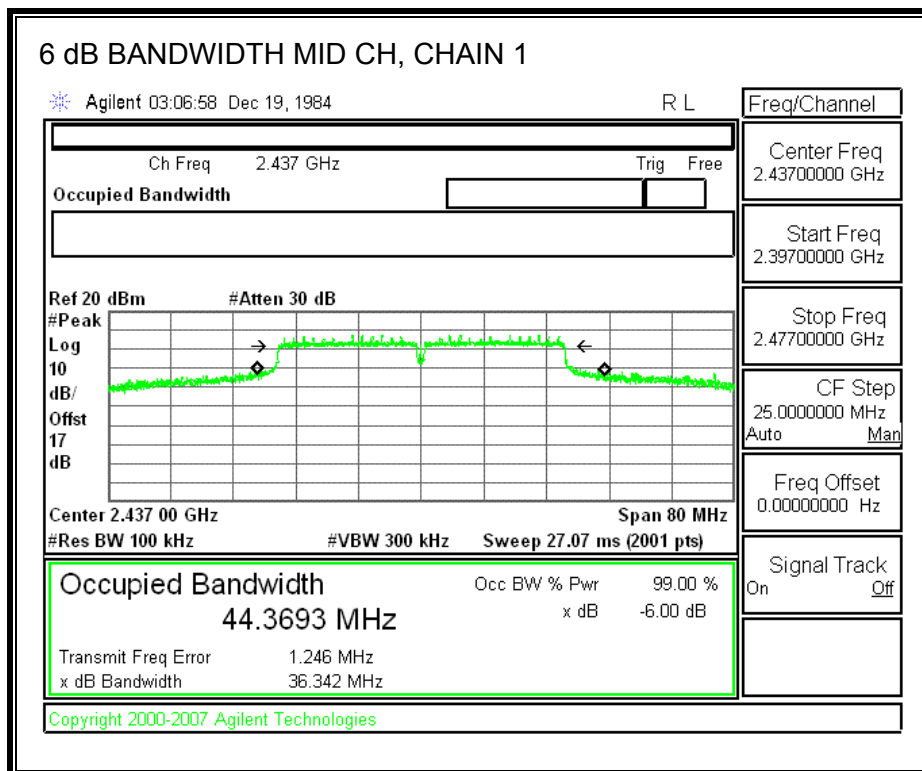
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 2437                       | 36.342                   | 0.5                            |



## 7.4.2. 99% BANDWIDTH

### LIMITS

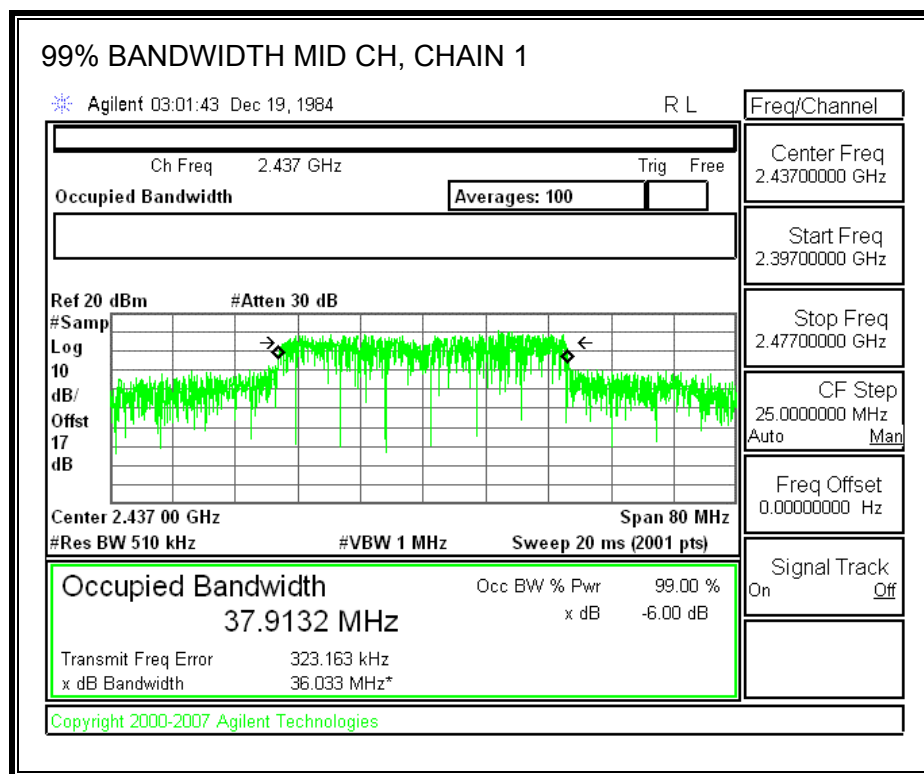
None; for reporting purposes only.

### 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) | Chain 1 (MHz) |
|---------|-----------------|---------------|
| Middle  | 2437            | 37.9132       |



### 7.4.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

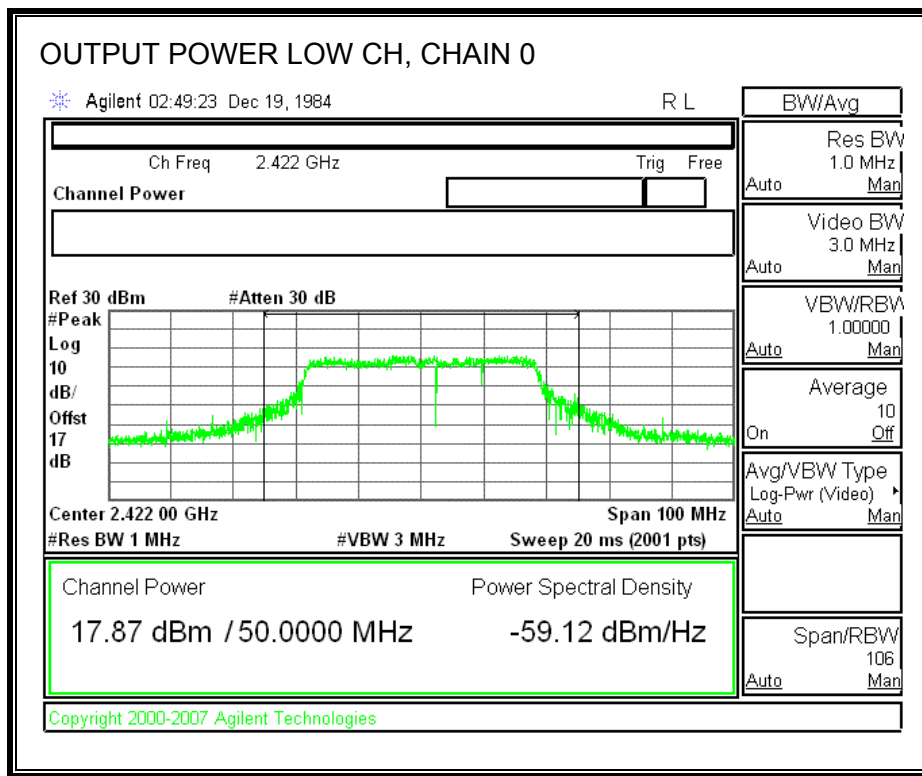
#### TEST PROCEDURE

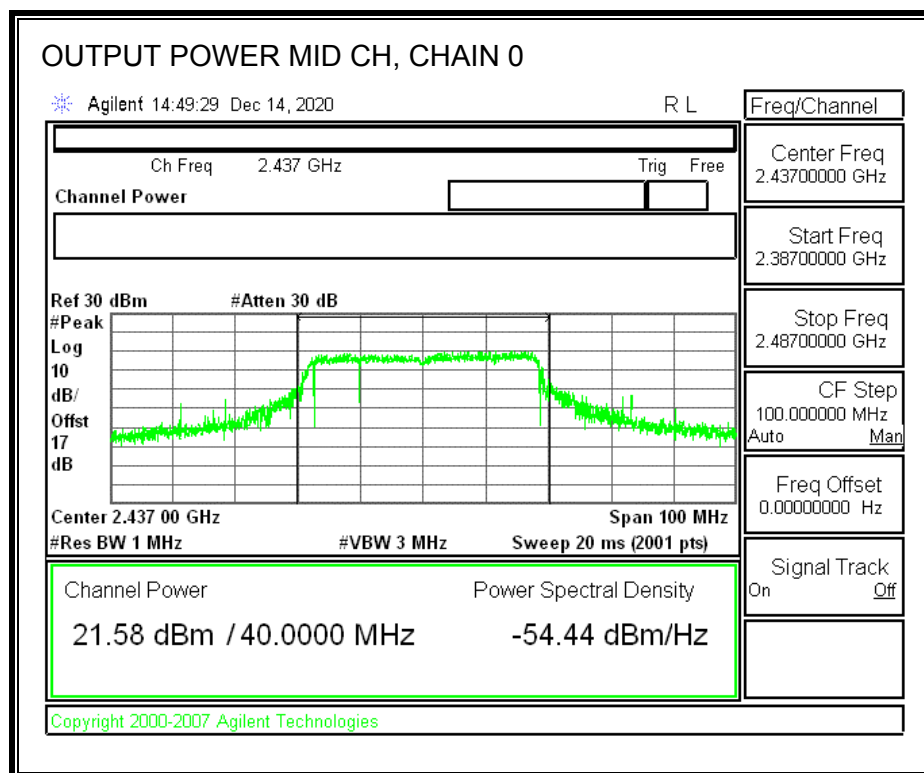
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

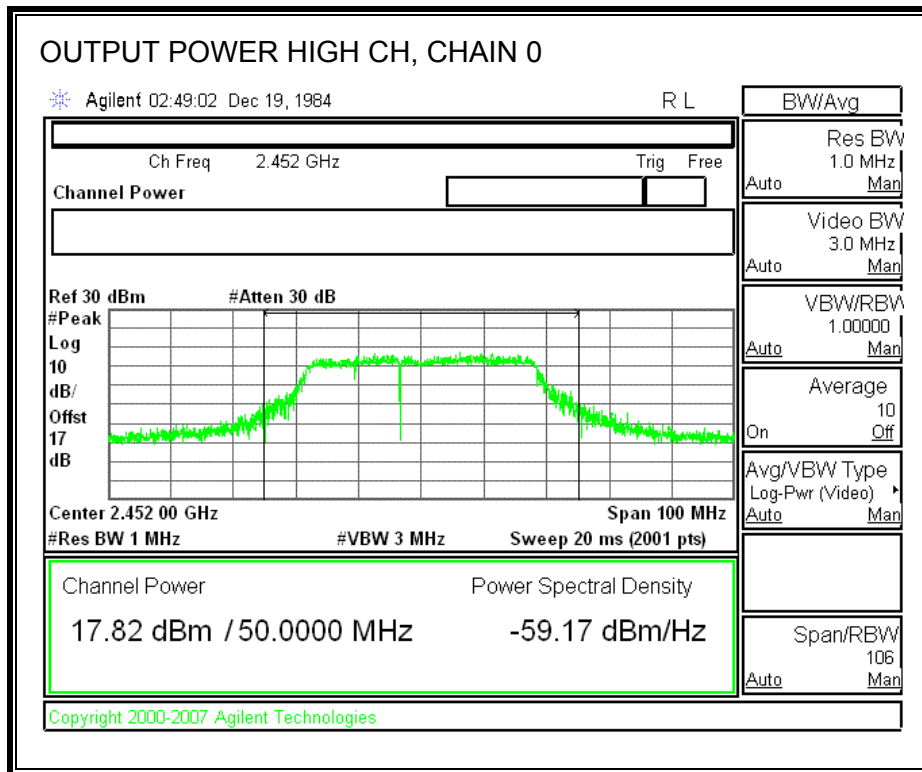
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 2422               | 30.00          | 17.87                     | 17.69                     | 20.79                   | -9.21          |
| Mid     | 2437               | 30.00          | 21.58                     | 22.21                     | 24.92                   | -5.08          |
| High    | 2452               | 30.00          | 17.82                     | 17.93                     | 20.89                   | -9.11          |

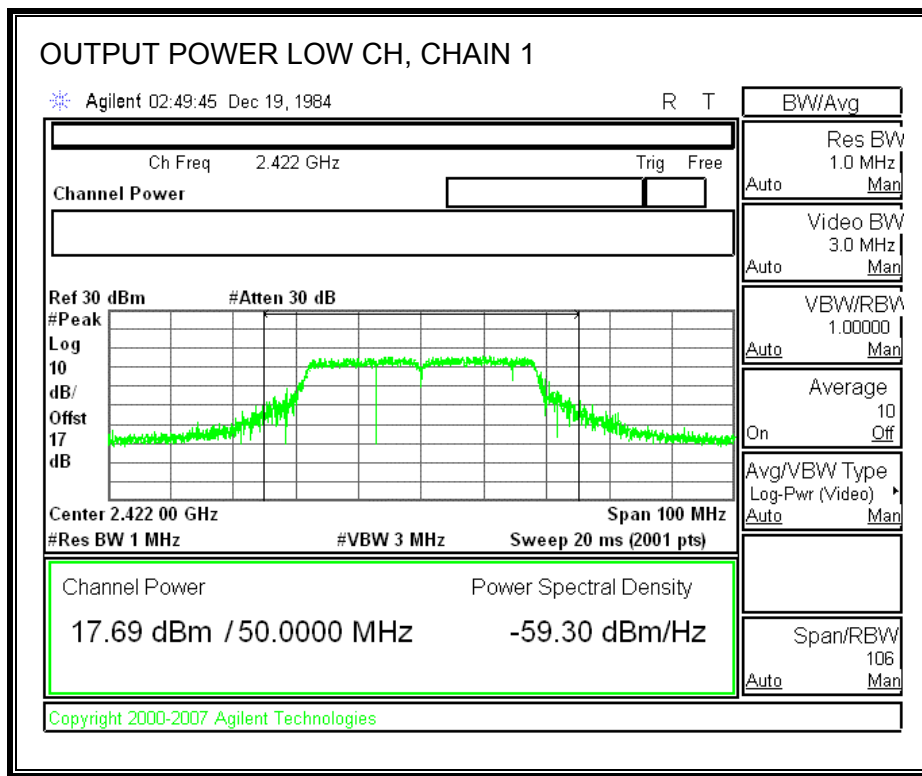
**CHAIN 0 OUTPUT POWER**

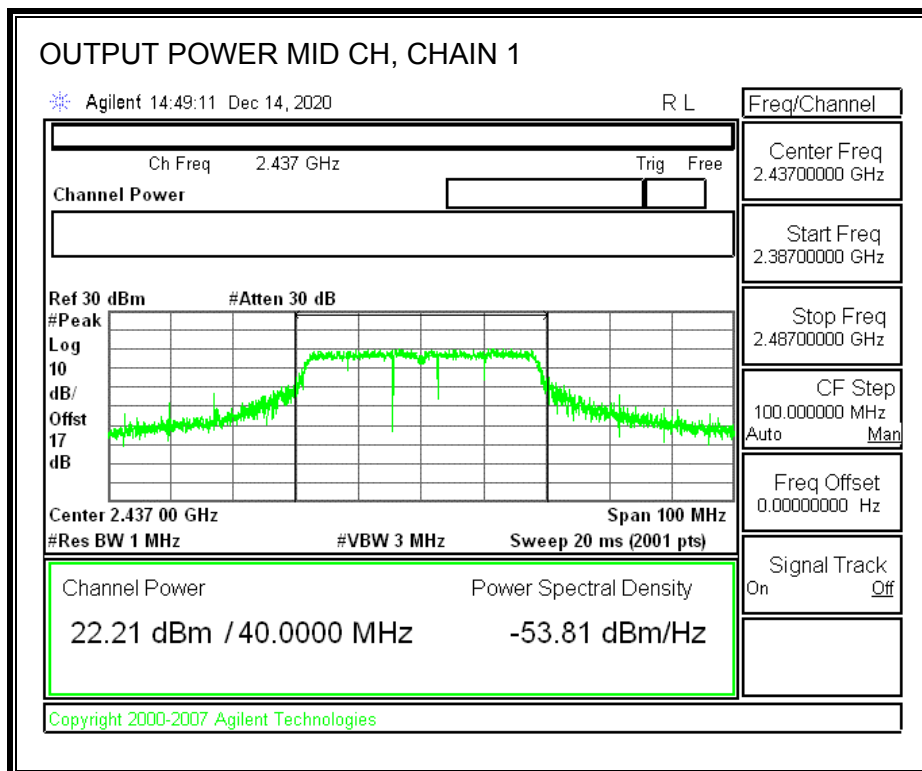


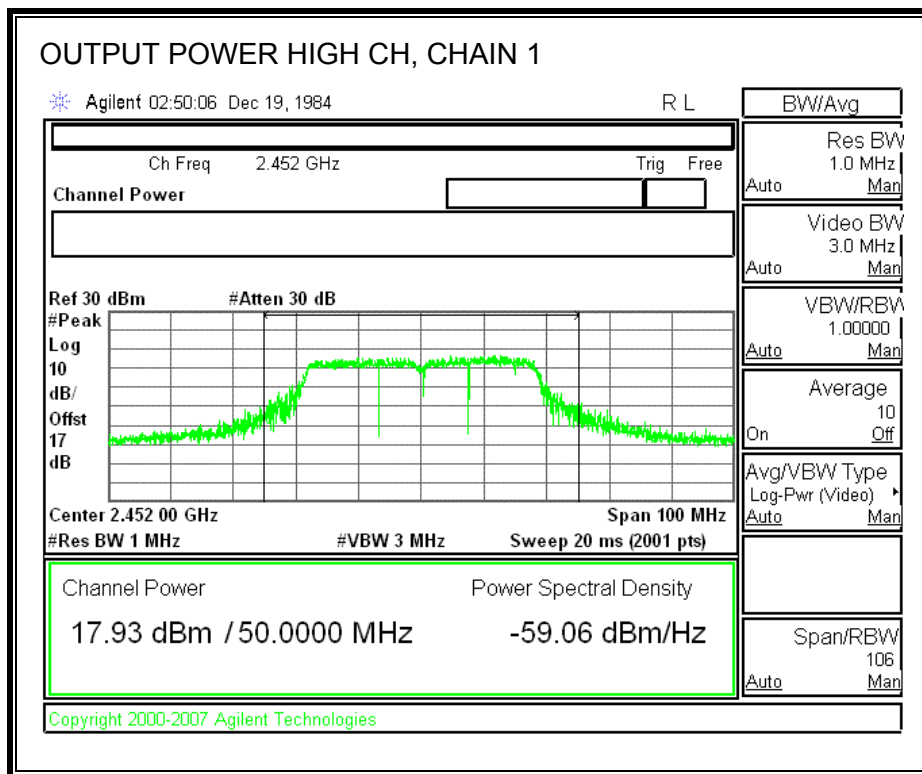




**CHAIN 1 OUTPUT POWER**







#### 7.4.4. AVERAGE POWER

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

The cable assembly insertion loss of 17 dB (including 16 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 2422               | 12.49                  | 12.23                  | 15.37                |
| Middle  | 2437               | 16.15                  | 16.91                  | 19.56                |
| High    | 2452               | 12.76                  | 12.80                  | 15.79                |

## 7.4.5. 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.

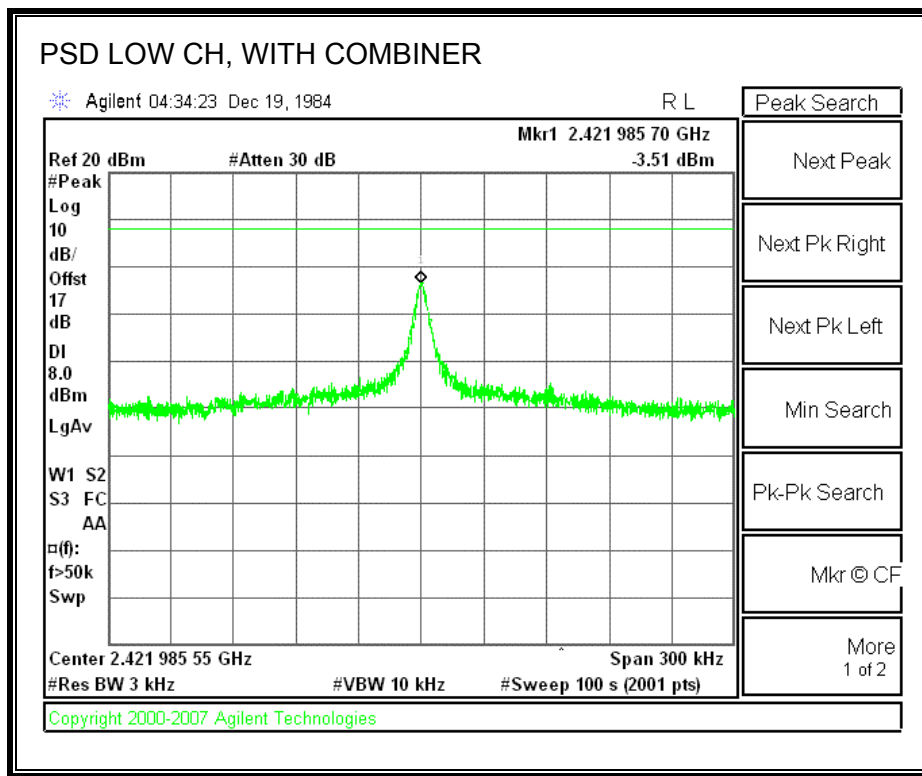
### TEST PROCEDURE

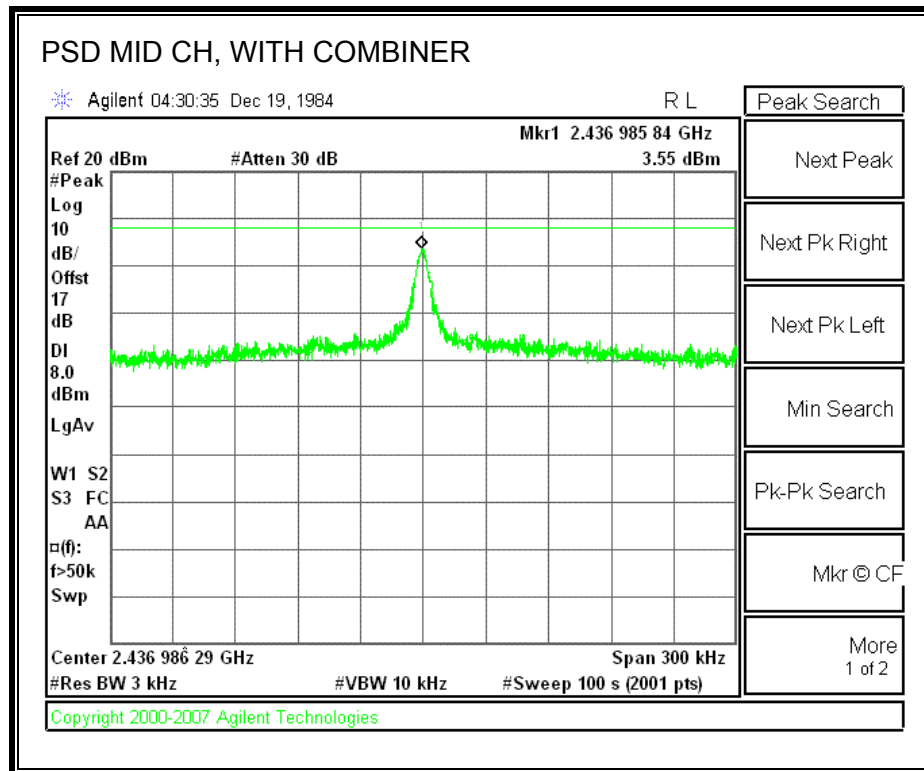
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

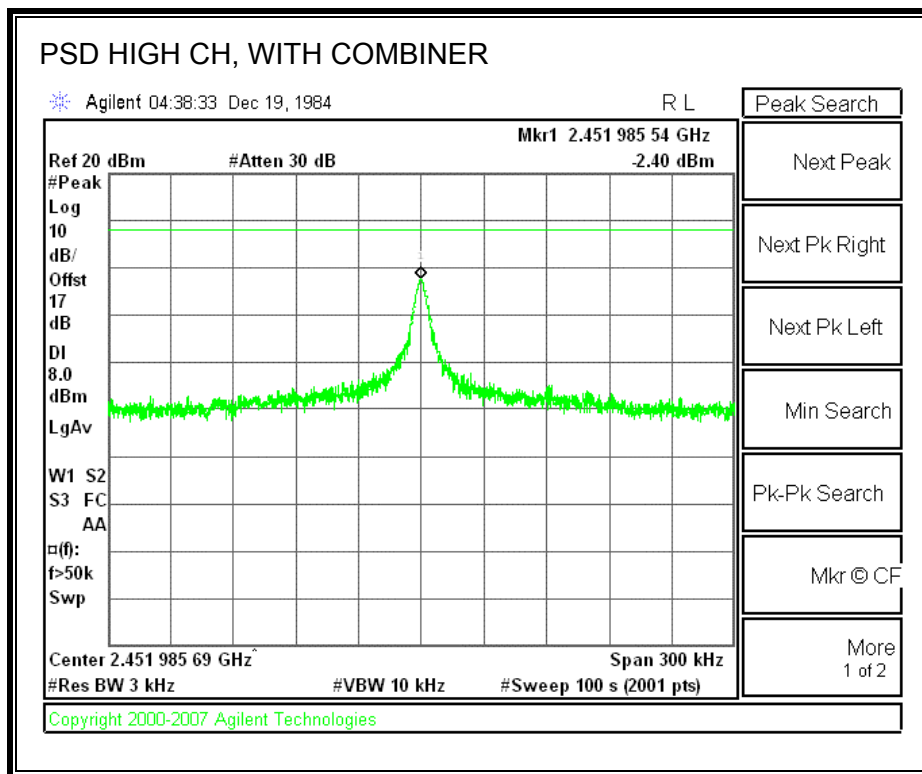
### RESULTS

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 2422               | -3.51                      | 8              | -11.51         |
| Middle  | 2437               | 3.55                       | 8              | -4.45          |
| High    | 2452               | -2.40                      | 8              | -10.40         |

**POWER SPECTRAL DENSITY, WITH COMBINER**







## **7.4.6. 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.

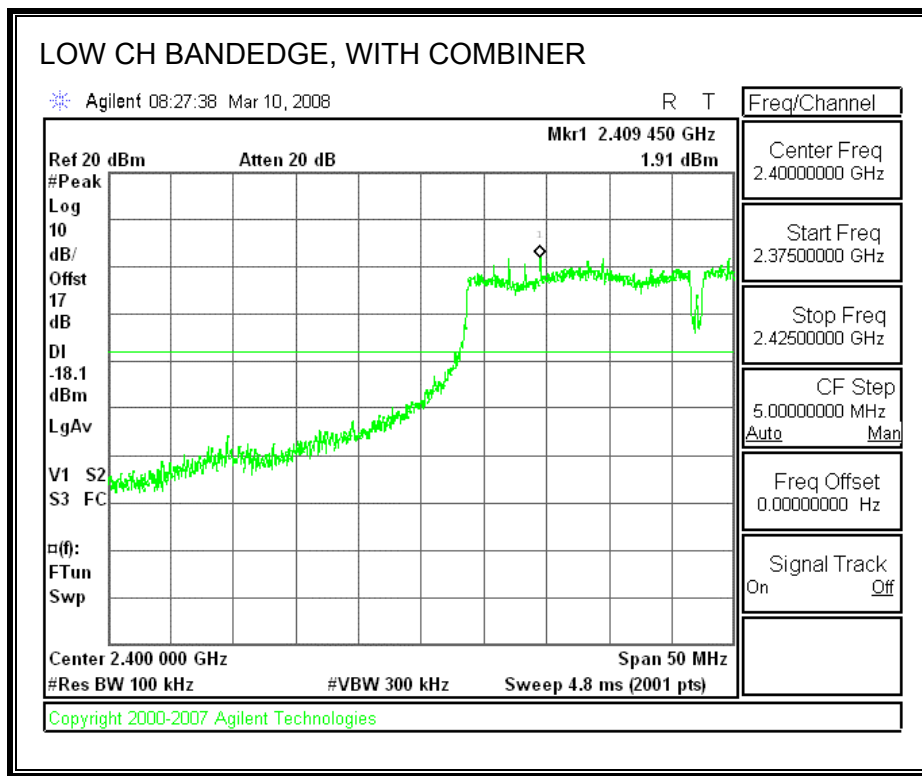
### **TEST PROCEDURE**

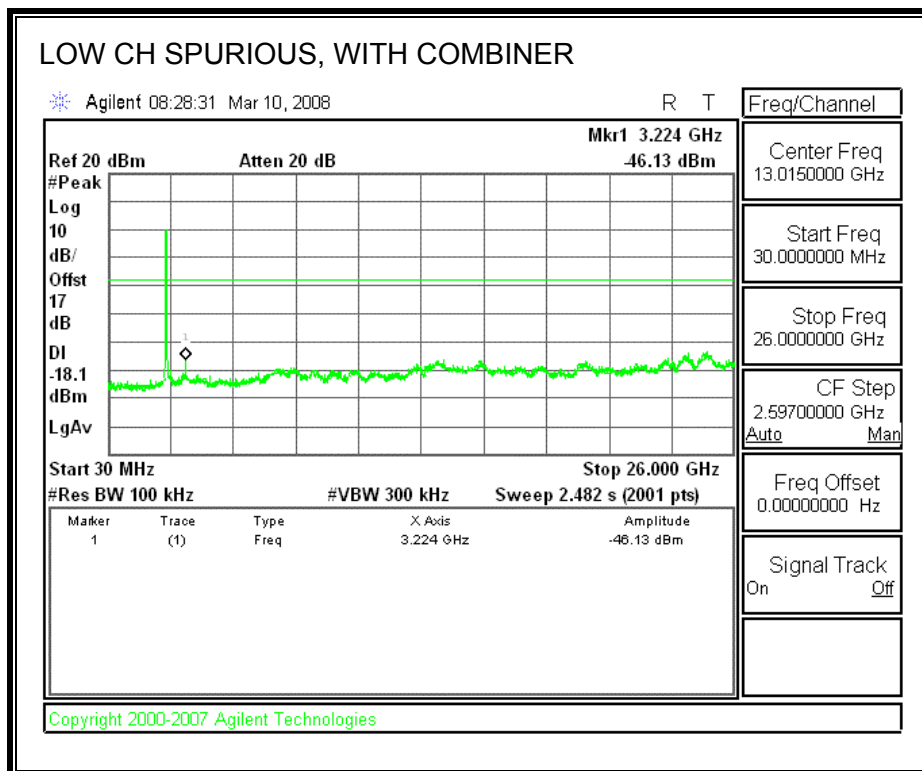
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

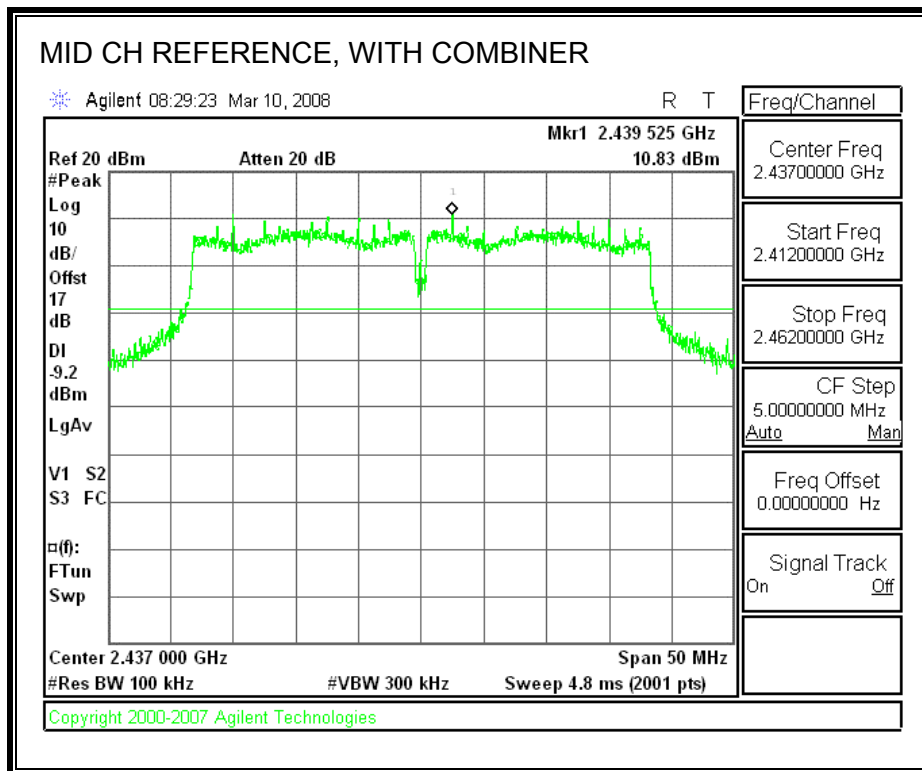
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

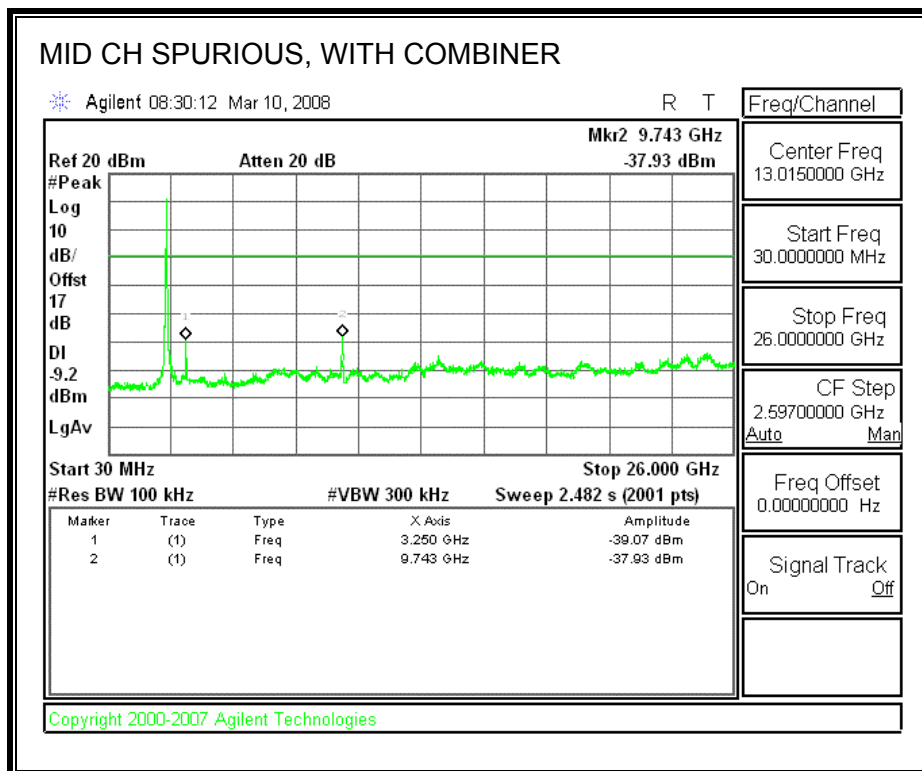
### **RESULTS**

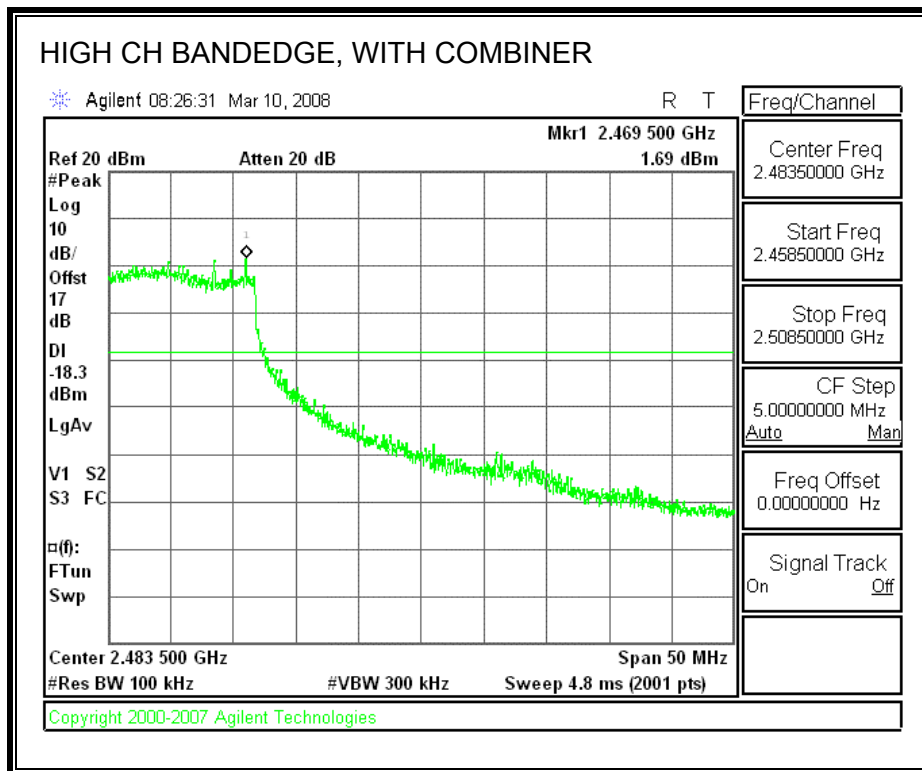
**SPURIOUS EMISSIONS WITH COMBINER**

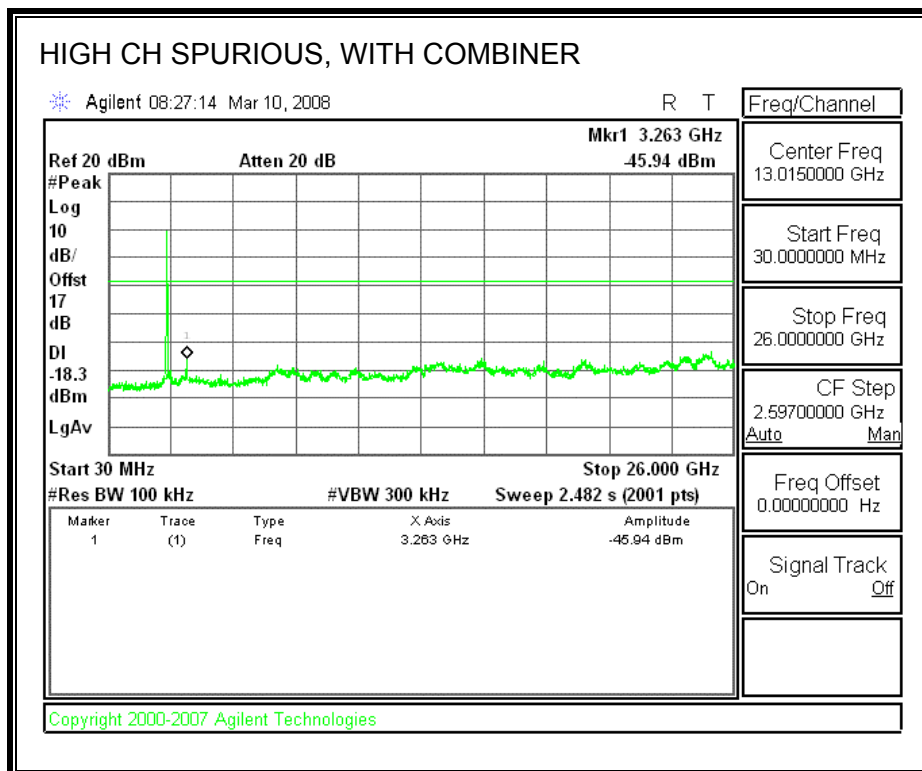












## **7.5. 802.11a MODE IN THE 5.8 GHz BAND**

### **7.5.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

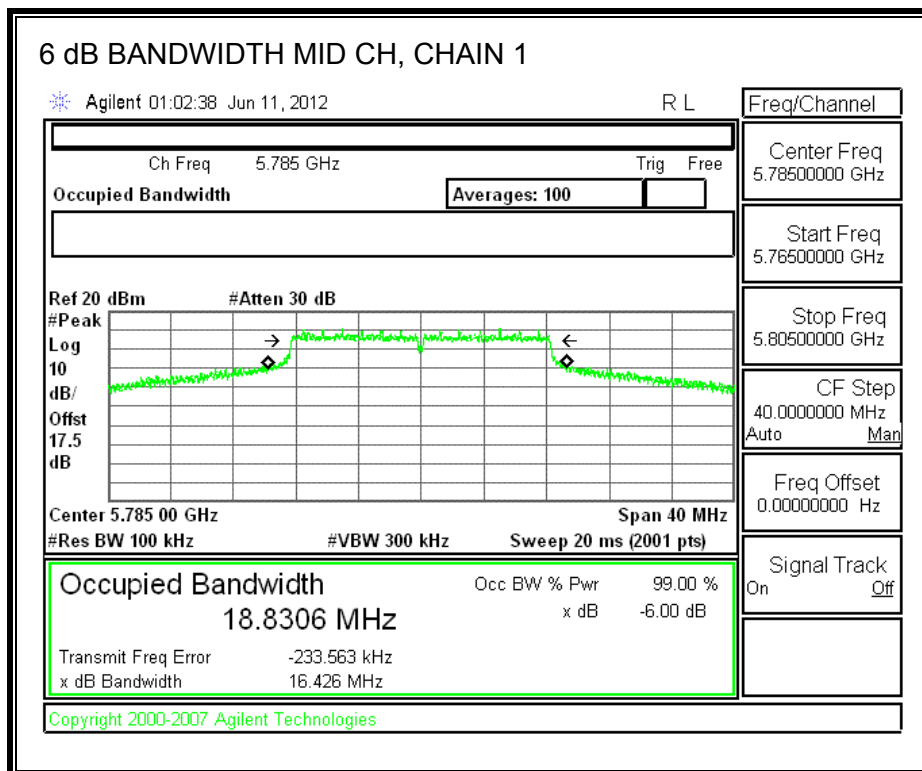
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 5785                       | 16.426                   | 0.5                            |



## 7.5.2. 99% BANDWIDTH

### LIMITS

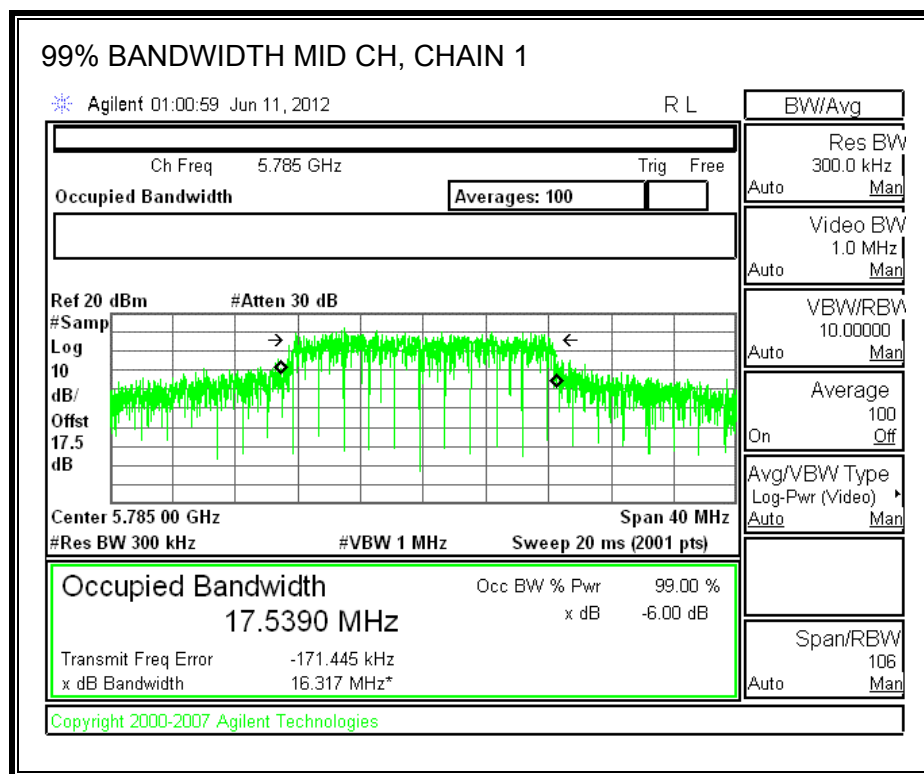
None; for reporting purposes only.

### 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<br>(MHz) | Chain 1<br>(MHz) |
|---------|--------------------|------------------|
| Middle  | 5785               | 17.539           |



### 7.5.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

| Effective Legacy Gain<br>(dBi) |
|--------------------------------|
| 6.76                           |

The maximum antenna gain is 6.76 dBi for P-To-M; therefore the limit is 29.24 dBm.

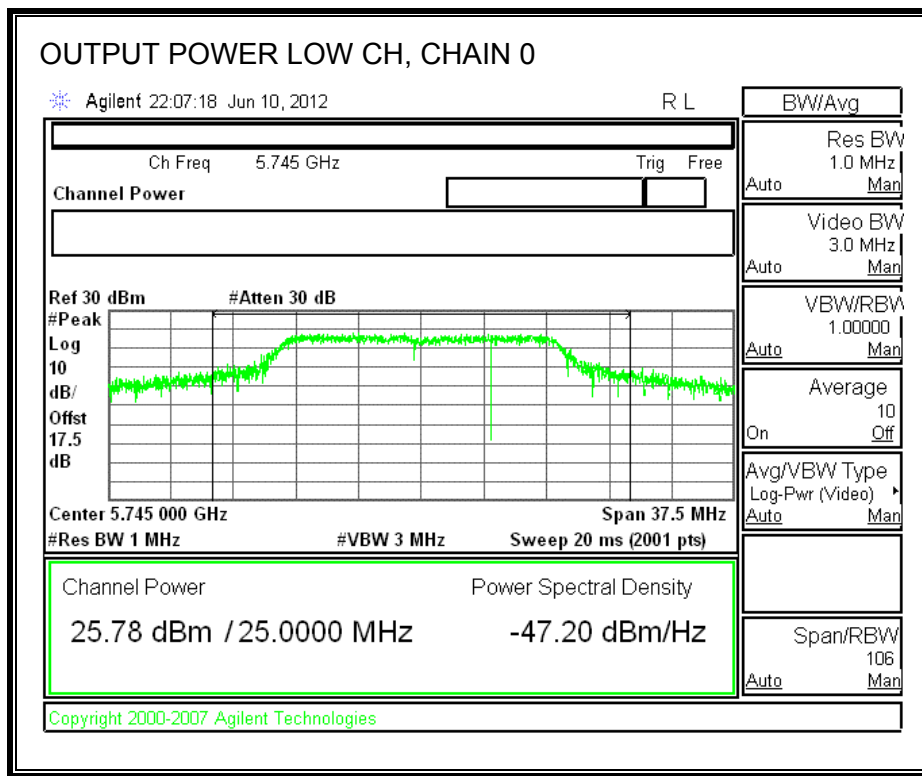
#### TEST PROCEDURE

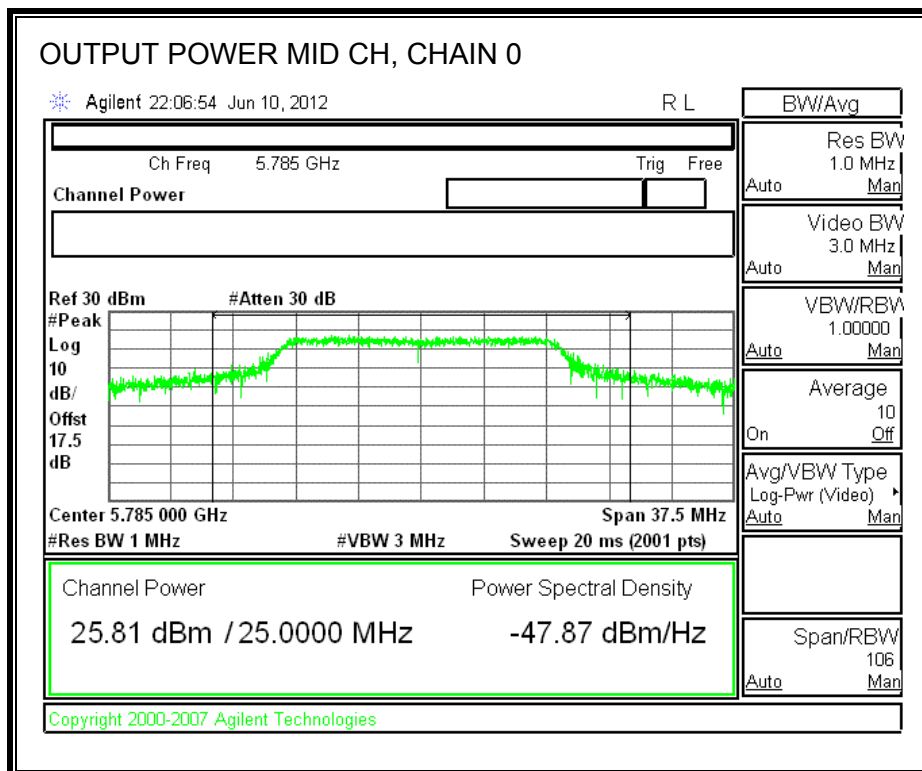
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

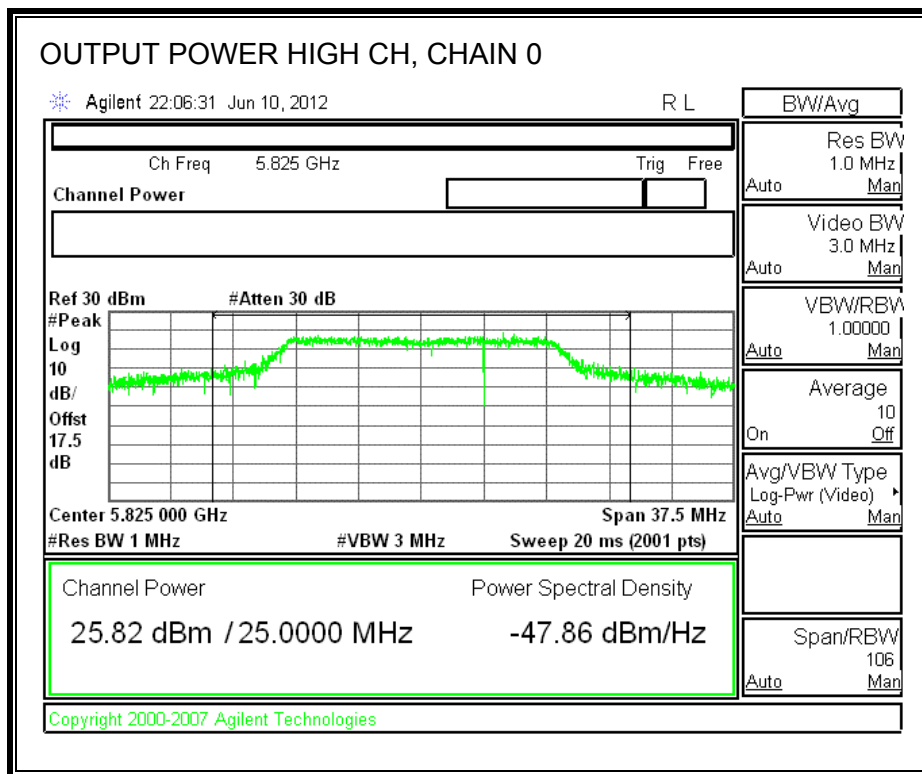
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 5745               | 29.24          | 25.78                     | 25.92                     | 28.86                   | -0.38          |
| Mid     | 5785               | 29.24          | 25.81                     | 25.93                     | 28.88                   | -0.36          |
| High    | 5825               | 29.24          | 25.82                     | 26.12                     | 28.98                   | -0.26          |

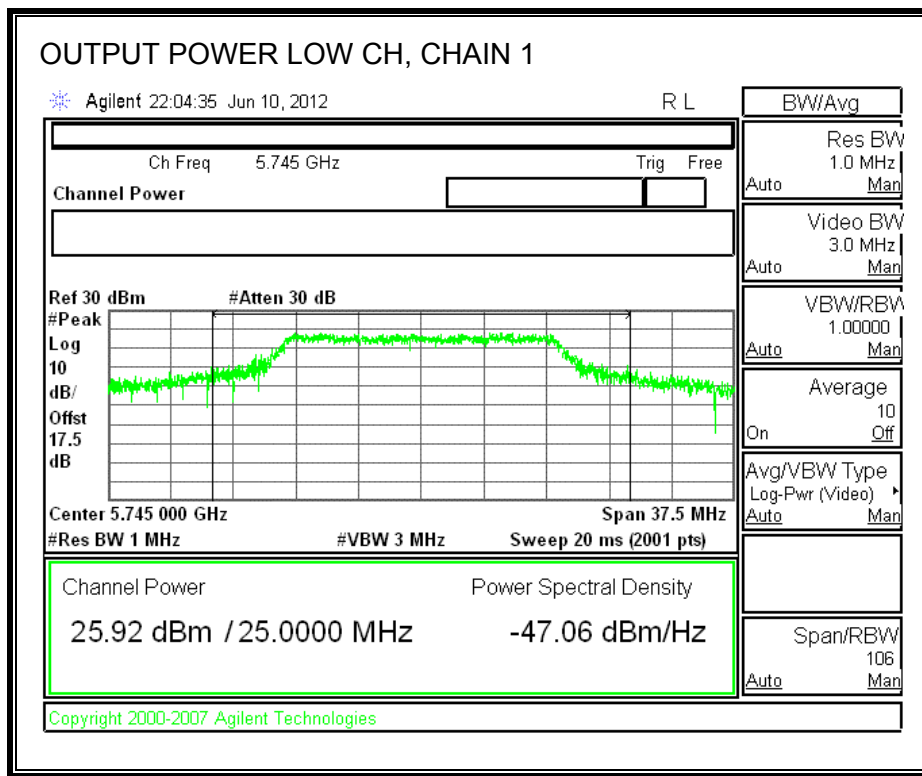
**CHAIN 0 OUTPUT POWER**

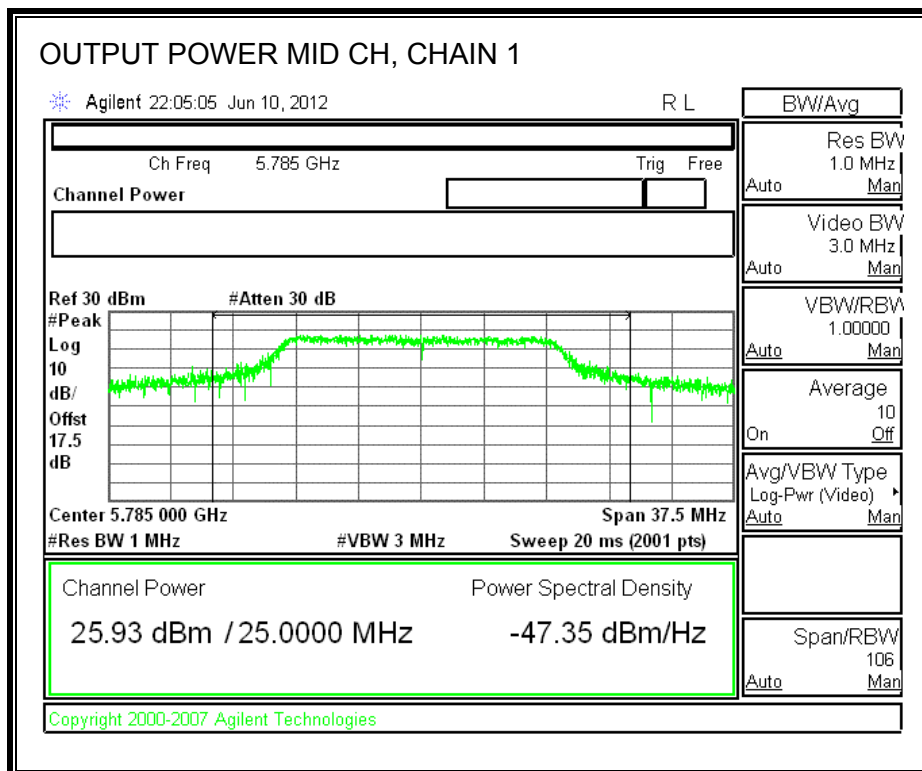


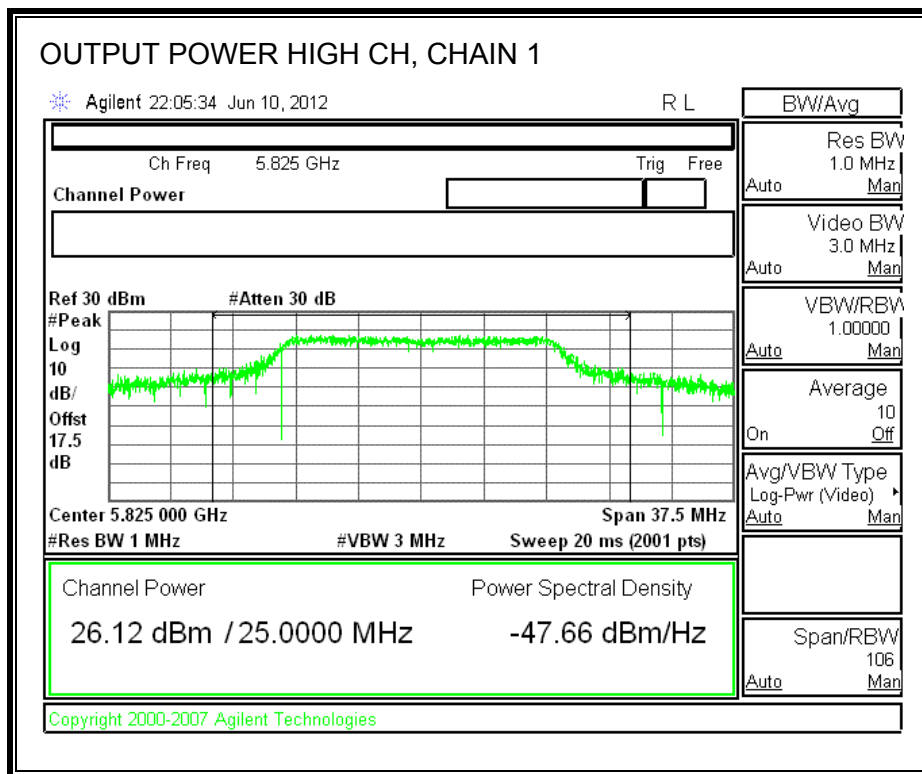




# **CHAIN 1 OUTPUT POWER**







#### 7.5.4. AVERAGE POWER

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

The cable assembly insertion loss of 17.5 dB (including 16 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 5745               | 19.58                  | 19.71                  | 22.66                |
| Middle  | 5785               | 19.20                  | 19.57                  | 22.40                |
| High    | 5825               | 19.03                  | 19.21                  | 22.13                |

## 7.5.5. 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.

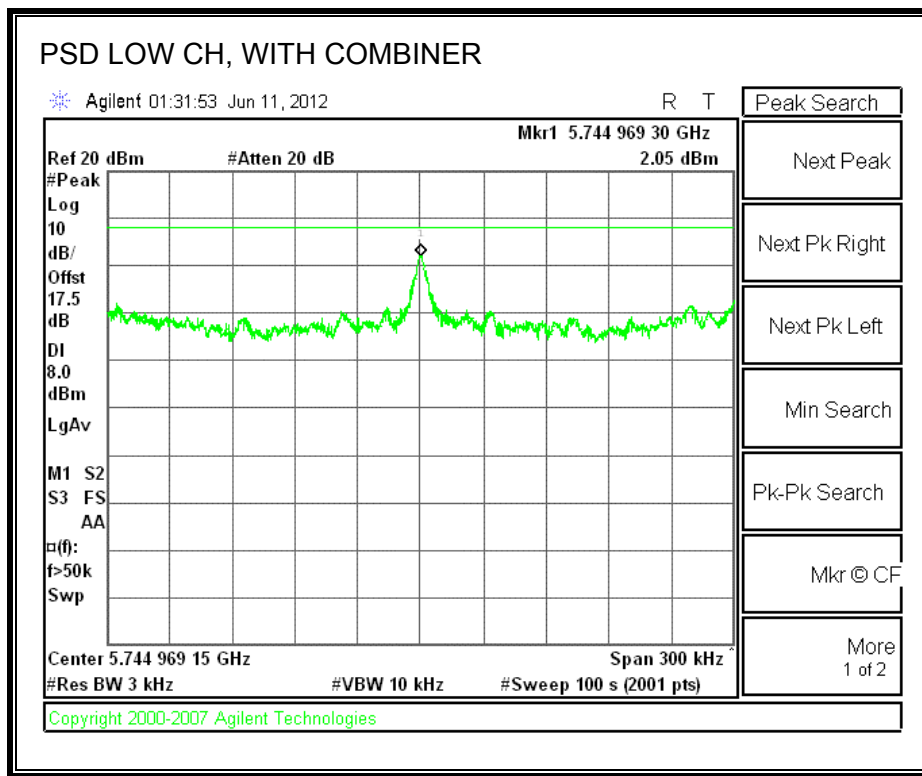
### TEST PROCEDURE

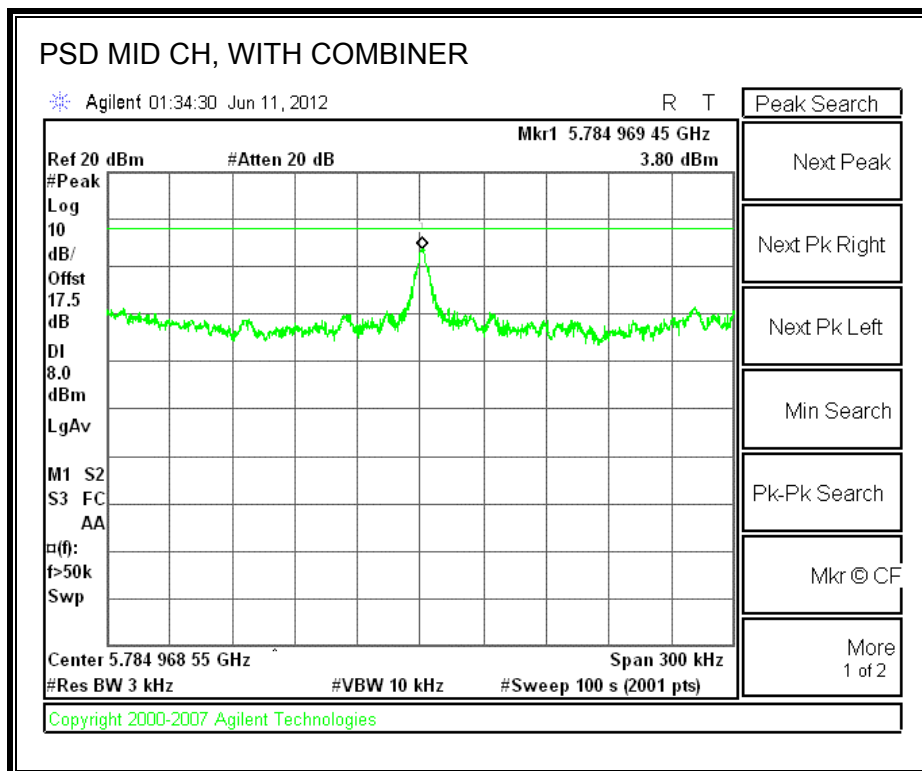
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

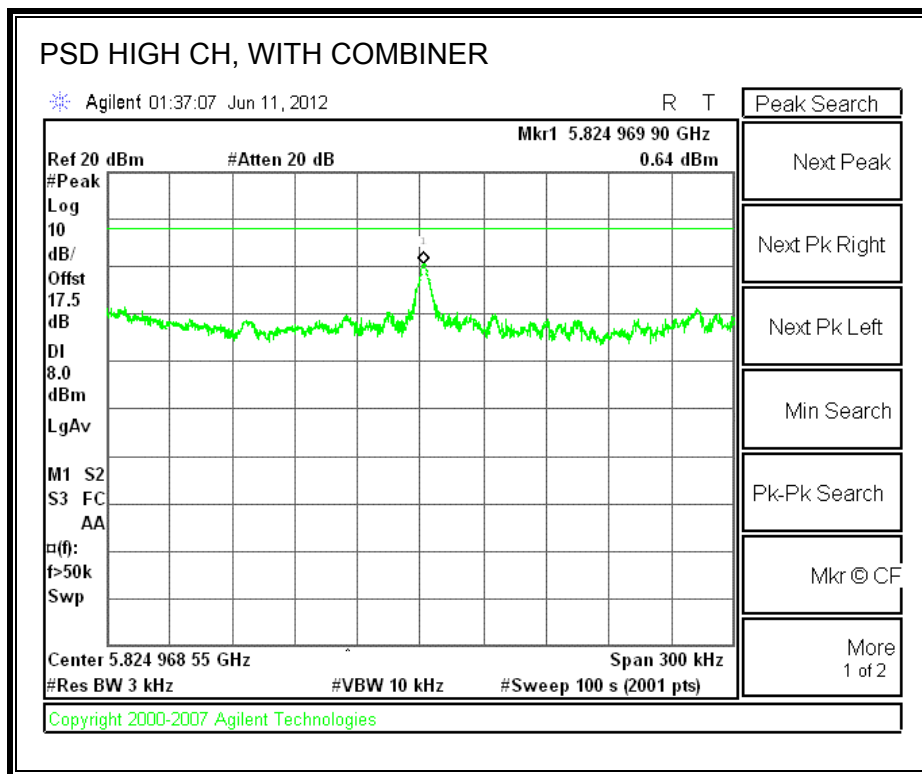
### RESULTS:

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 5745               | 2.05                       | 8              | -5.95          |
| Middle  | 5785               | 3.80                       | 8              | -4.20          |
| High    | 5825               | 0.64                       | 8              | -7.36          |

**POWER SPECTRAL DENSITY, WITH COMBINER**







## **7.5.6. 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.

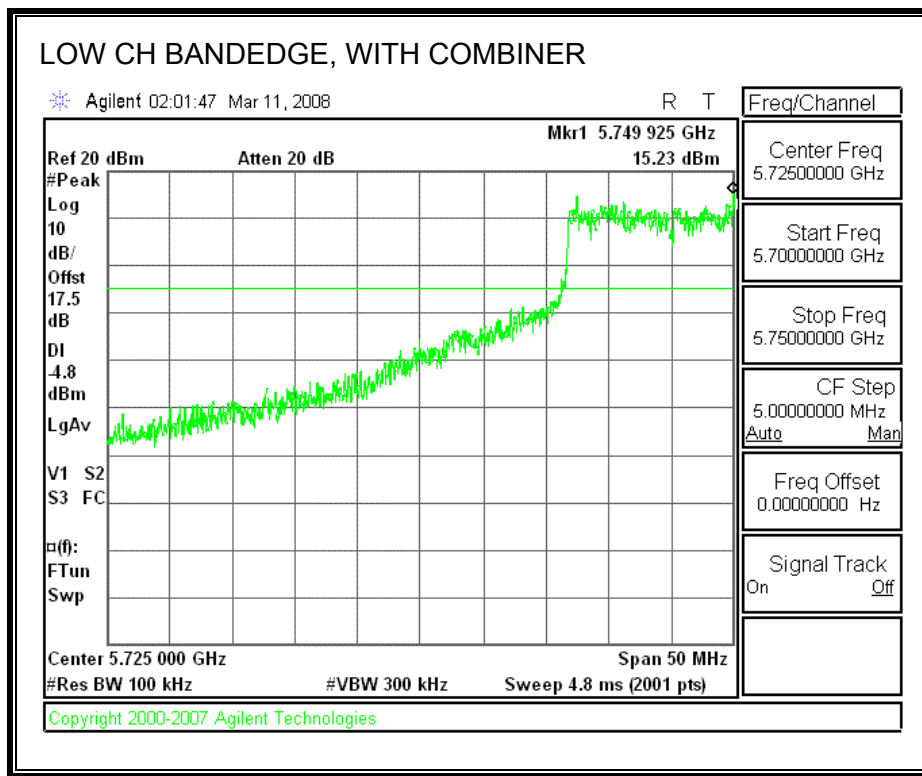
### **TEST PROCEDURE**

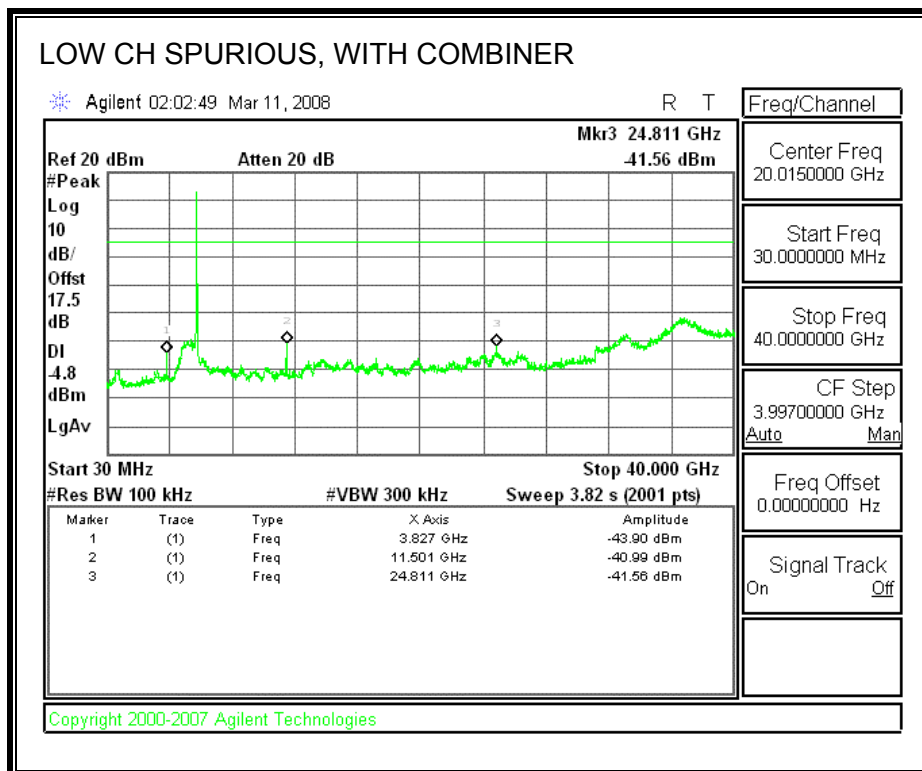
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

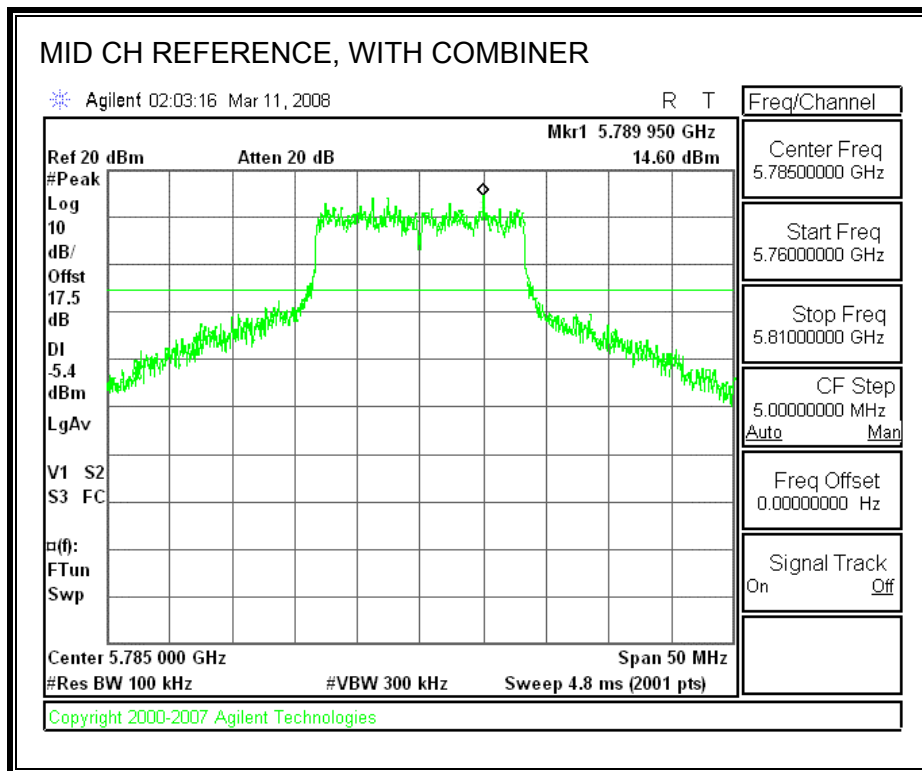
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

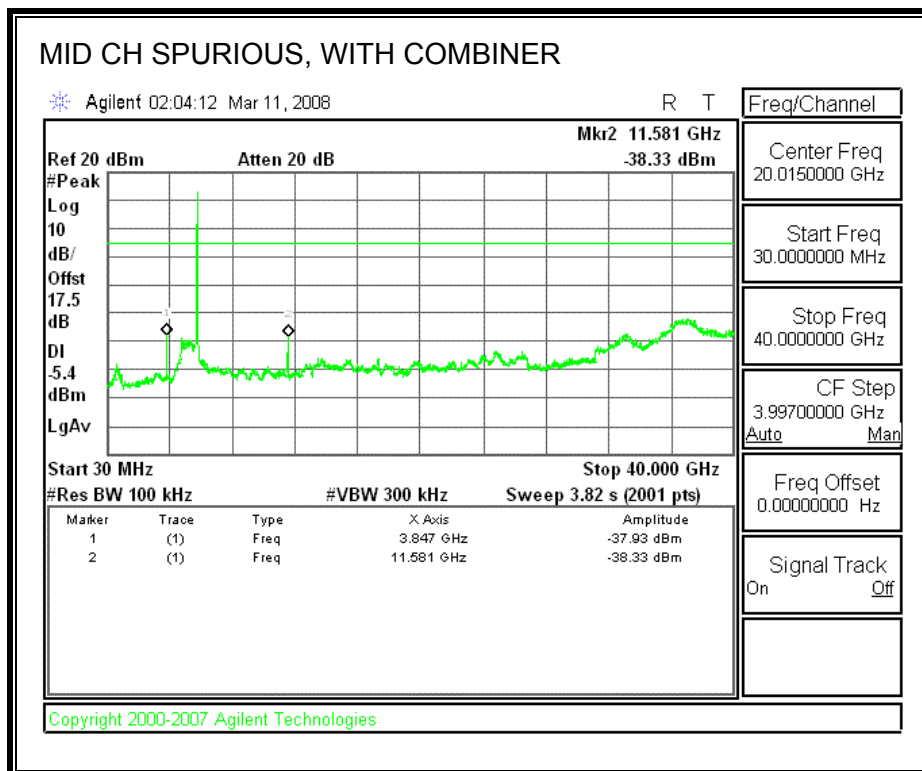
### **RESULTS**

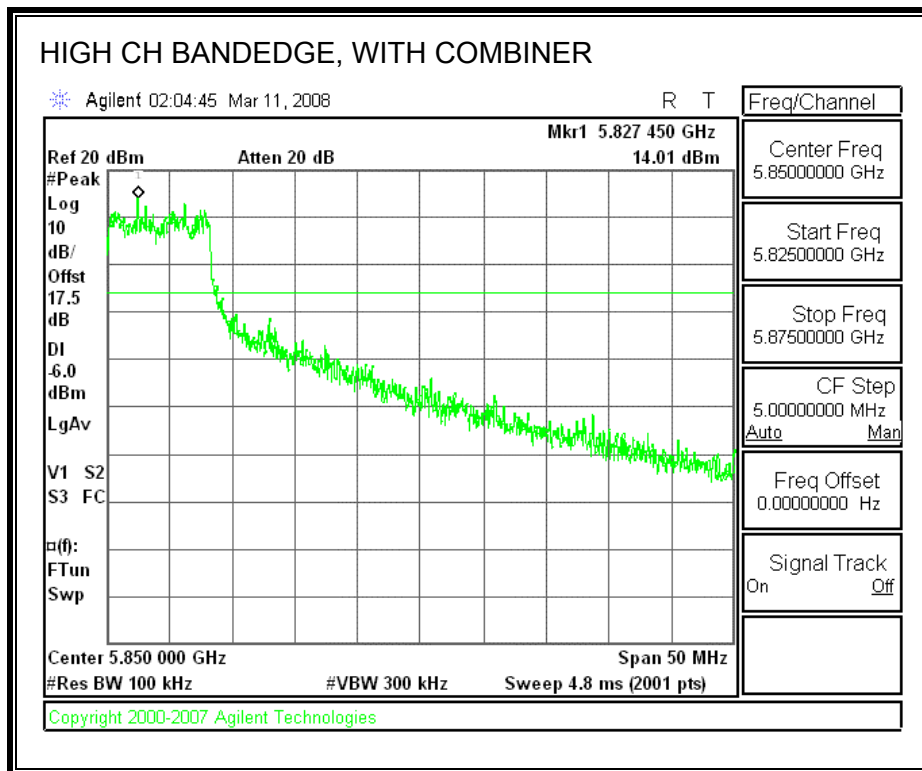
**SPURIOUS EMISSIONS WITH COMBINER**

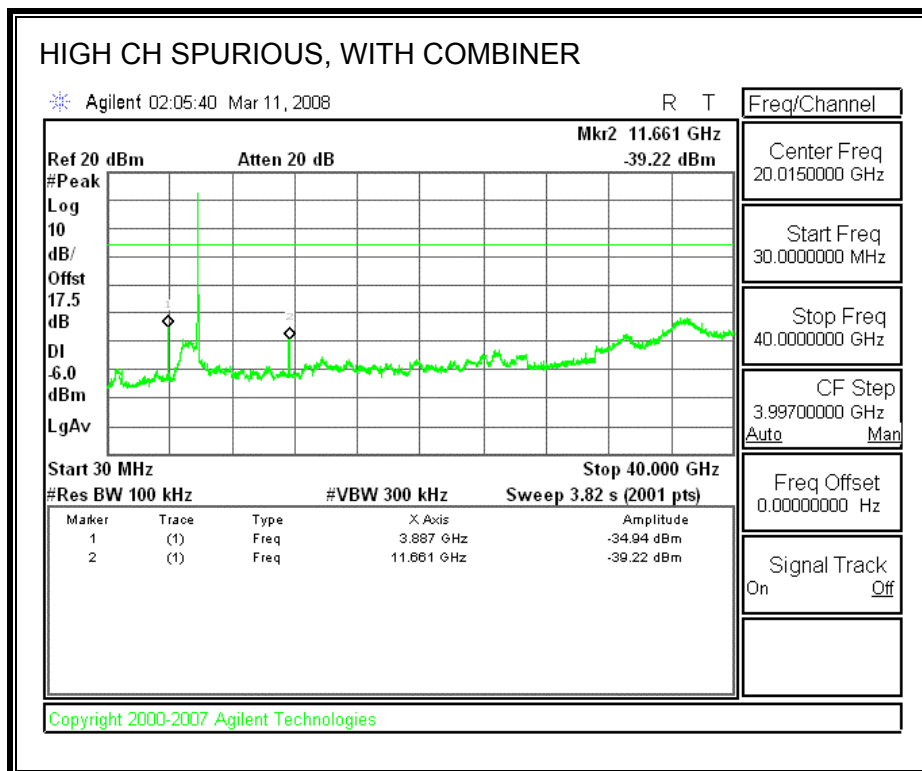












## **7.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND**

### **7.6.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

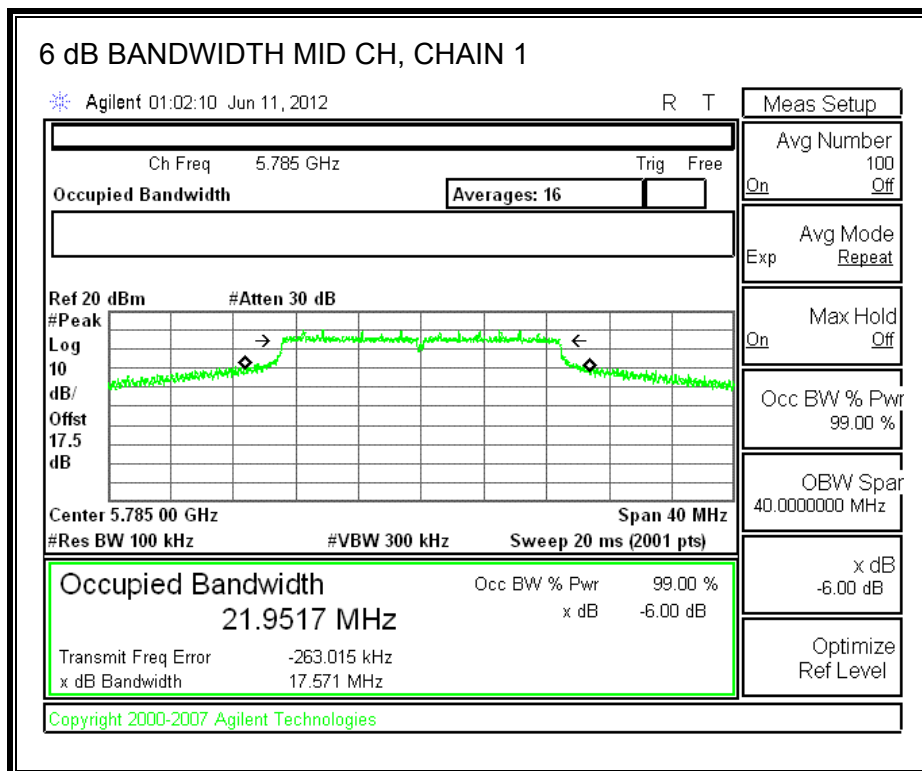
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 5785                       | 17.571                   | 0.5                            |



## 7.6.2. 99% BANDWIDTH

### LIMITS

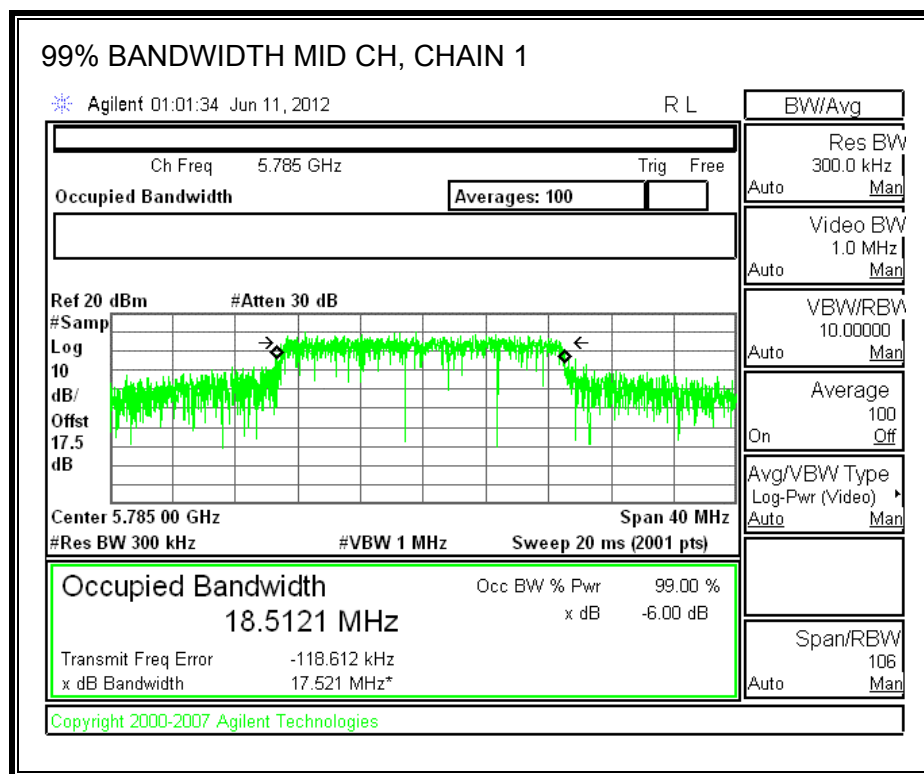
None; for reporting purposes only.

### 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<br>(MHz) | Chain 1<br>(MHz) |
|---------|--------------------|------------------|
| Middle  | 5785               | 18.5121          |



### 7.6.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

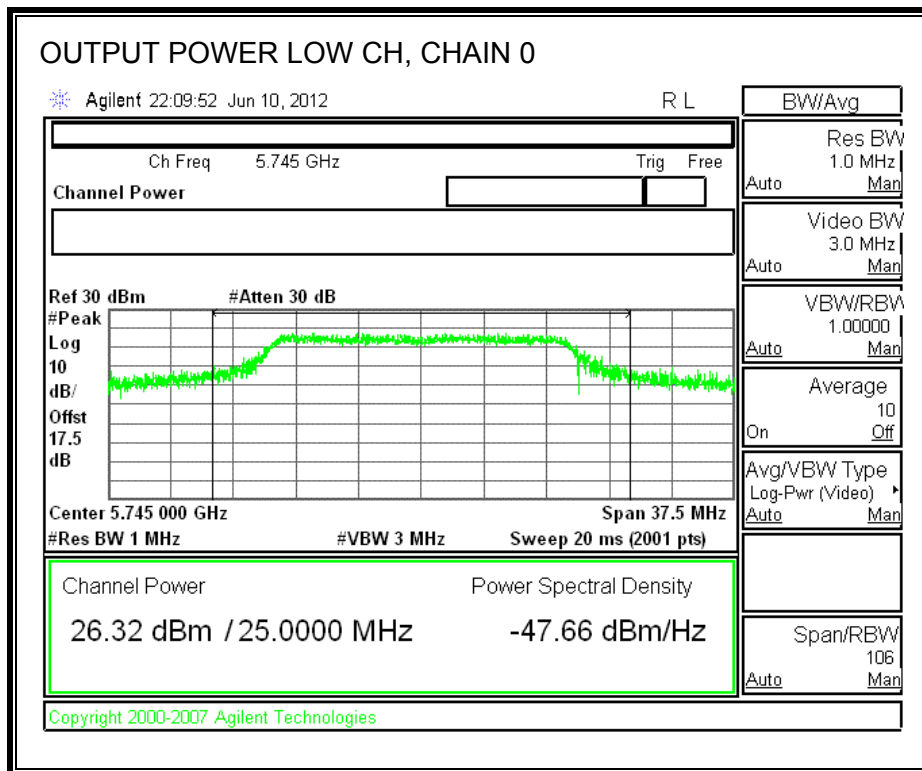
#### TEST PROCEDURE

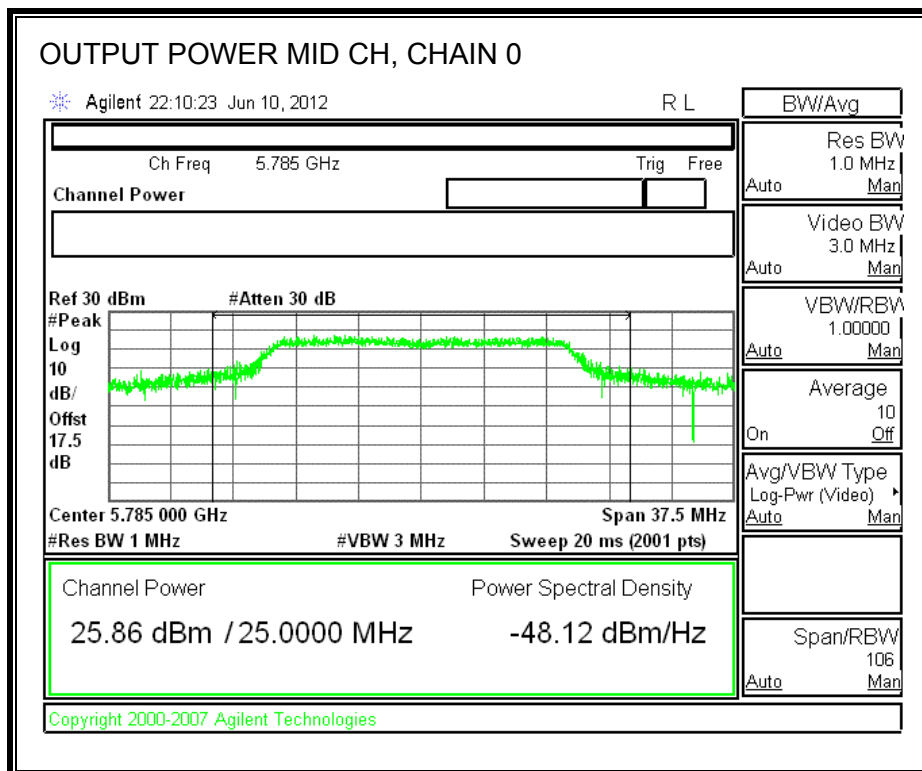
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

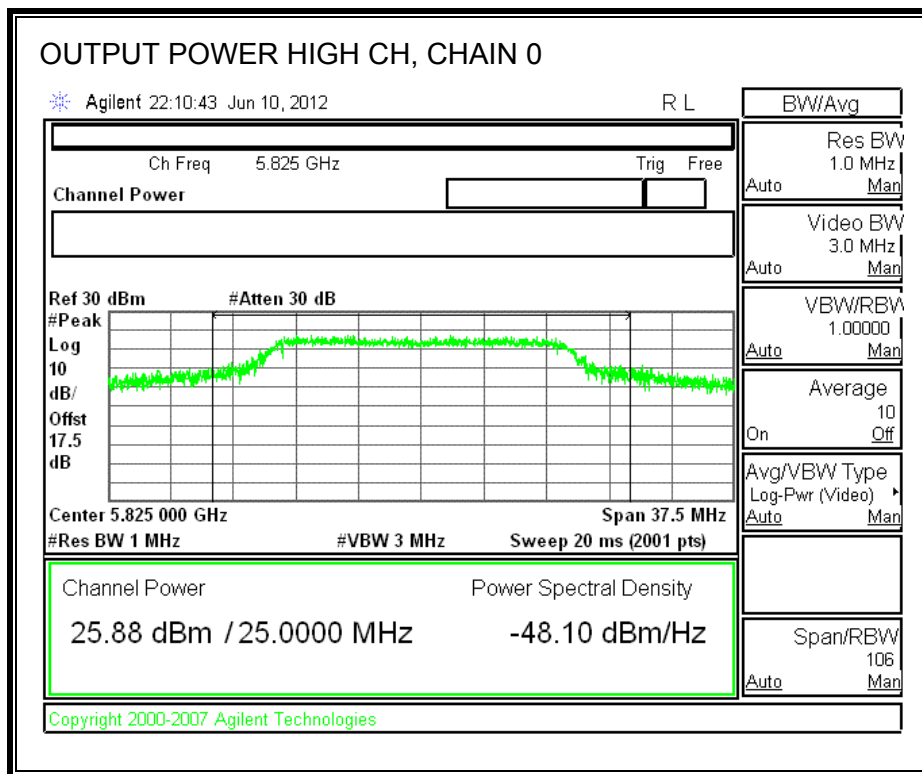
#### RESULTS

| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 5745               | 30.00          | 26.32                     | 26.07                     | 29.21                   | -0.79          |
| Mid     | 5785               | 30.00          | 25.86                     | 26.15                     | 29.02                   | -0.98          |
| High    | 5825               | 30.00          | 25.88                     | 26.17                     | 29.04                   | -0.96          |

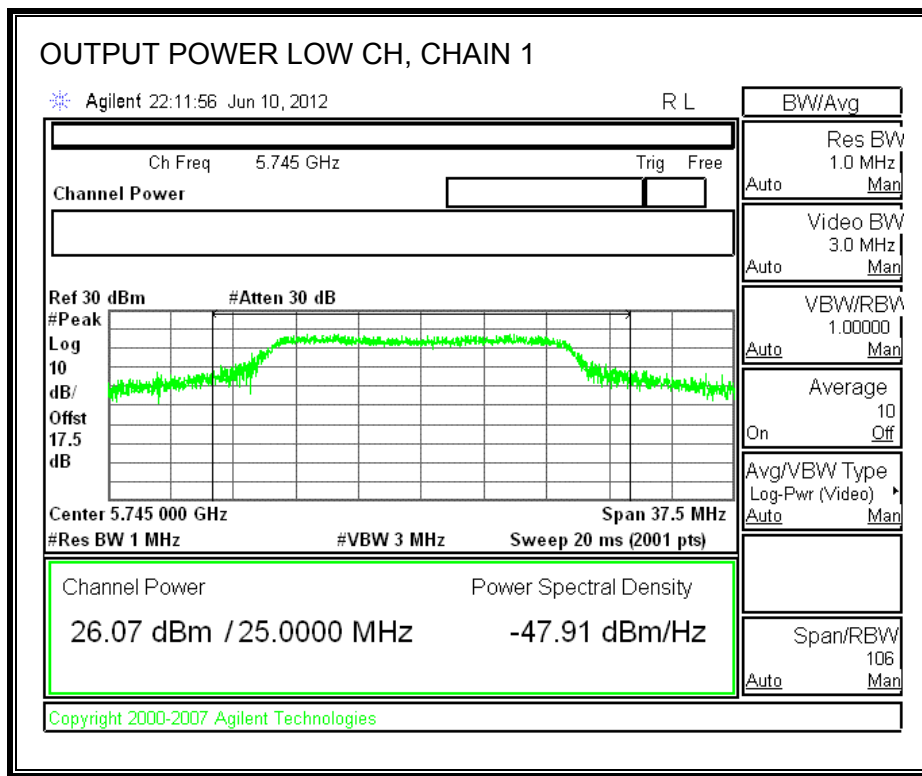
CHAIN 0 OUTPUT POWER

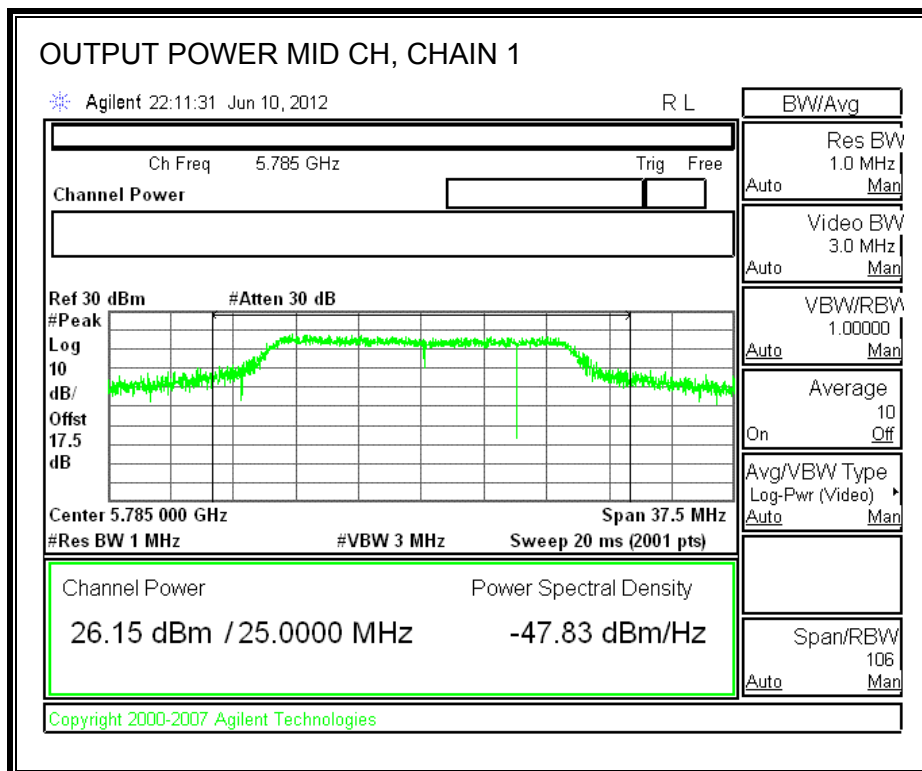


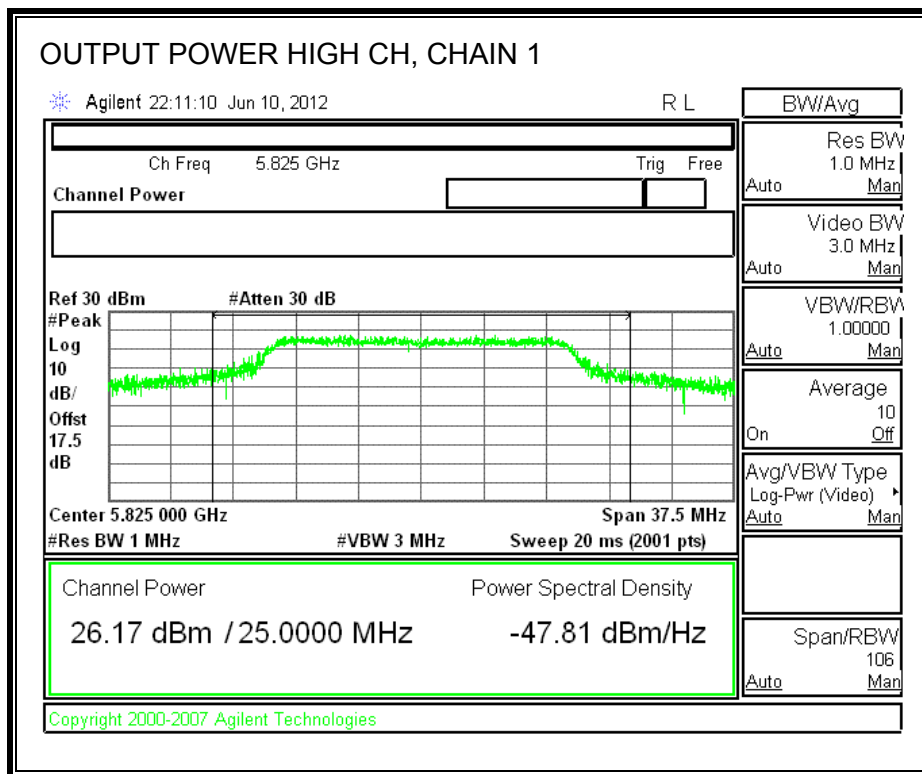




**CHAIN 1 OUTPUT POWER**







#### 7.6.4. AVERAGE POWER

##### LIMITS

None; for reporting purposes only.

##### TEST PROCEDURE

The transmitter output is connected to a power meter.

##### RESULTS

The cable assembly insertion loss of 17.5 dB (including 16 dB pad and 1.5 dB cable) entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 5745               | 19.73                  | 19.72                  | 22.74                |
| Middle  | 5785               | 19.35                  | 19.54                  | 22.46                |
| High    | 5825               | 18.99                  | 19.39                  | 22.20                |

## 7.6.5. 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.

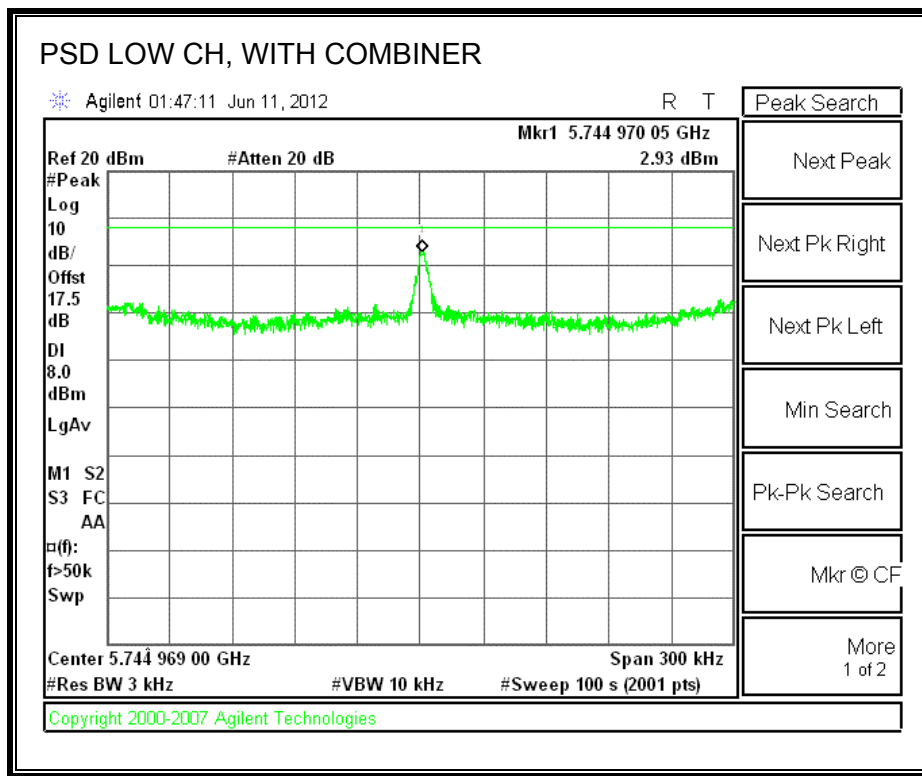
### TEST PROCEDURE

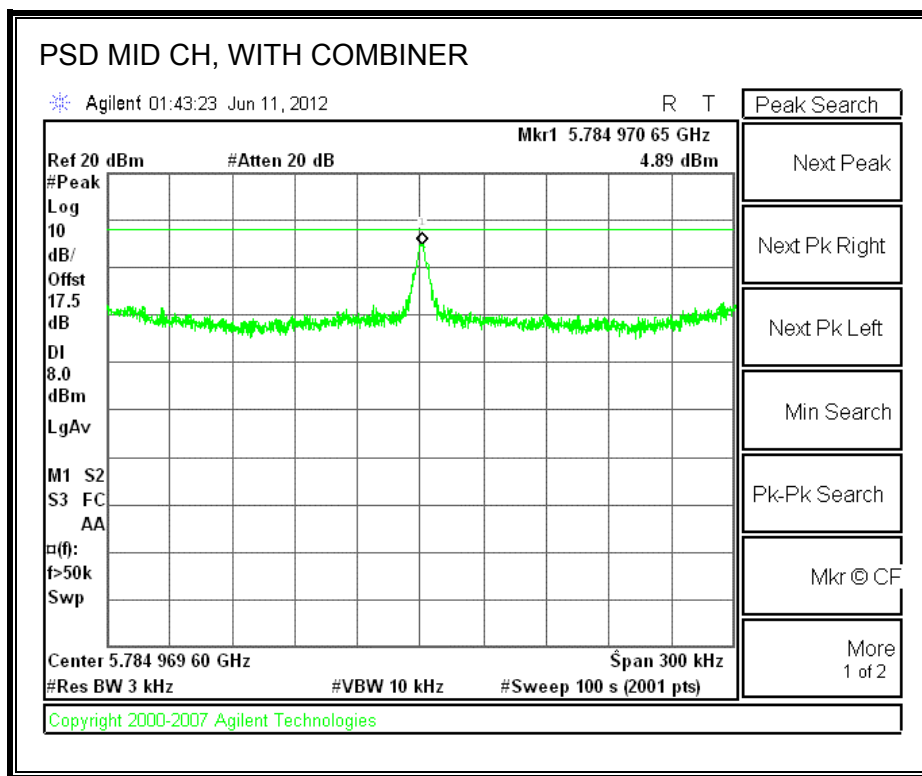
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

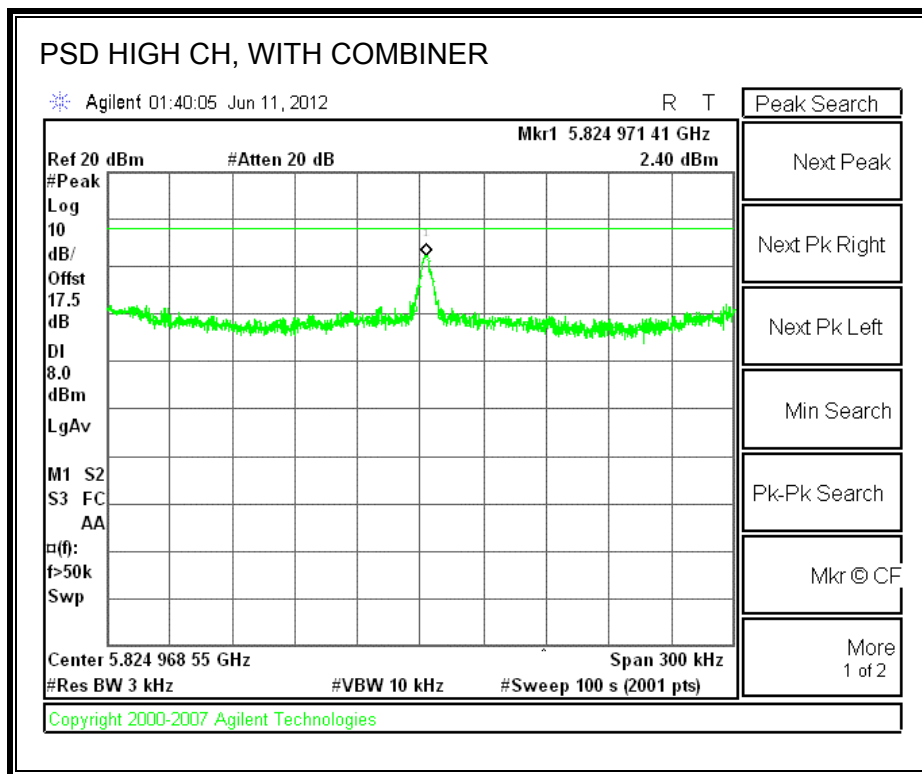
### RESULTS:

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 5745               | 2.93                       | 8              | -5.07          |
| Middle  | 5785               | 4.89                       | 8              | -3.11          |
| High    | 5825               | 2.40                       | 8              | -5.60          |

**POWER SPECTRAL DENSITY, WITH COMBINER**







## **7.6.6. 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.

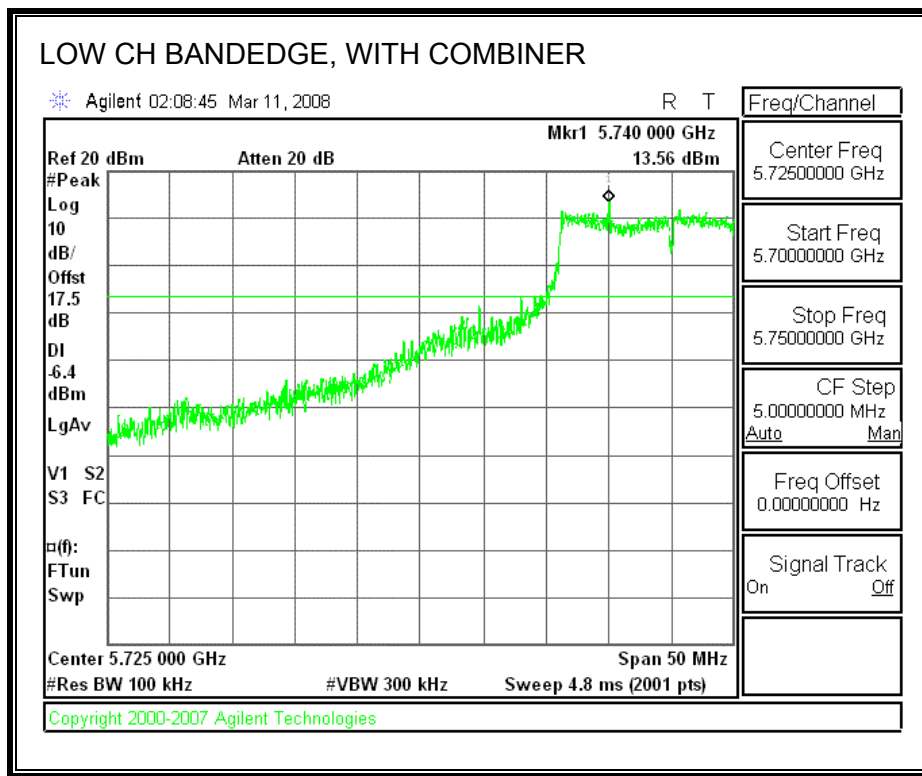
### **TEST PROCEDURE**

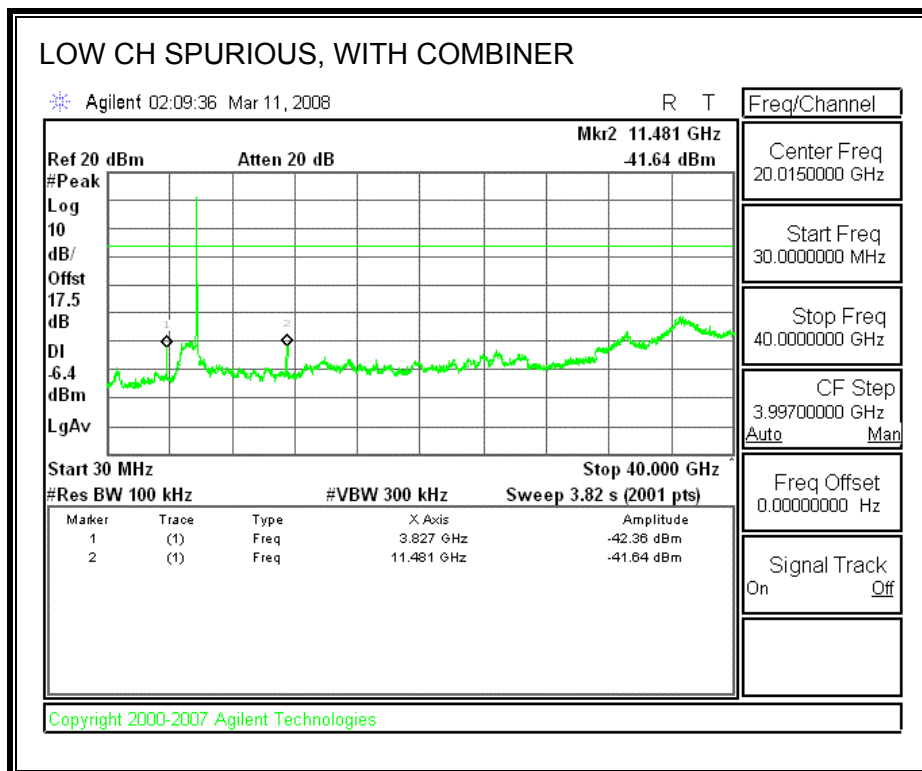
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

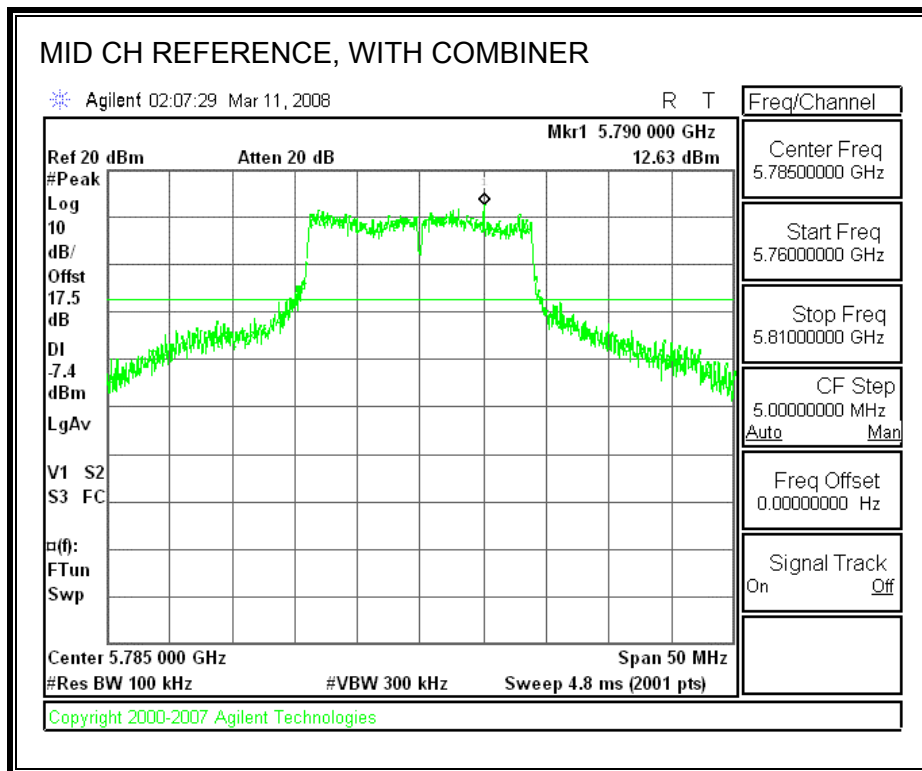
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

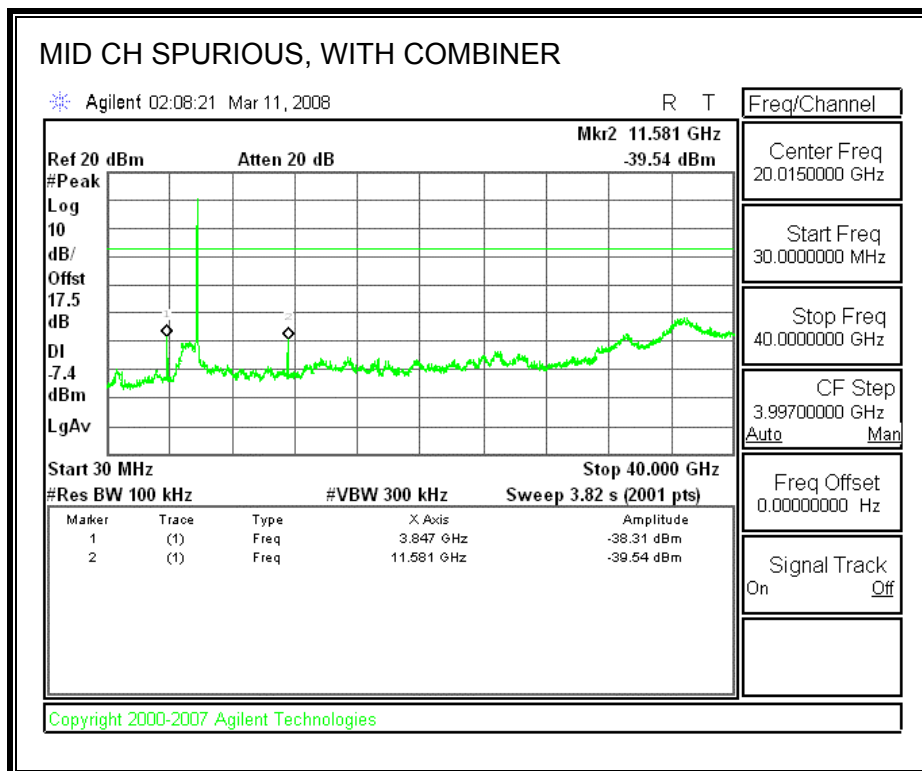
### **RESULTS**

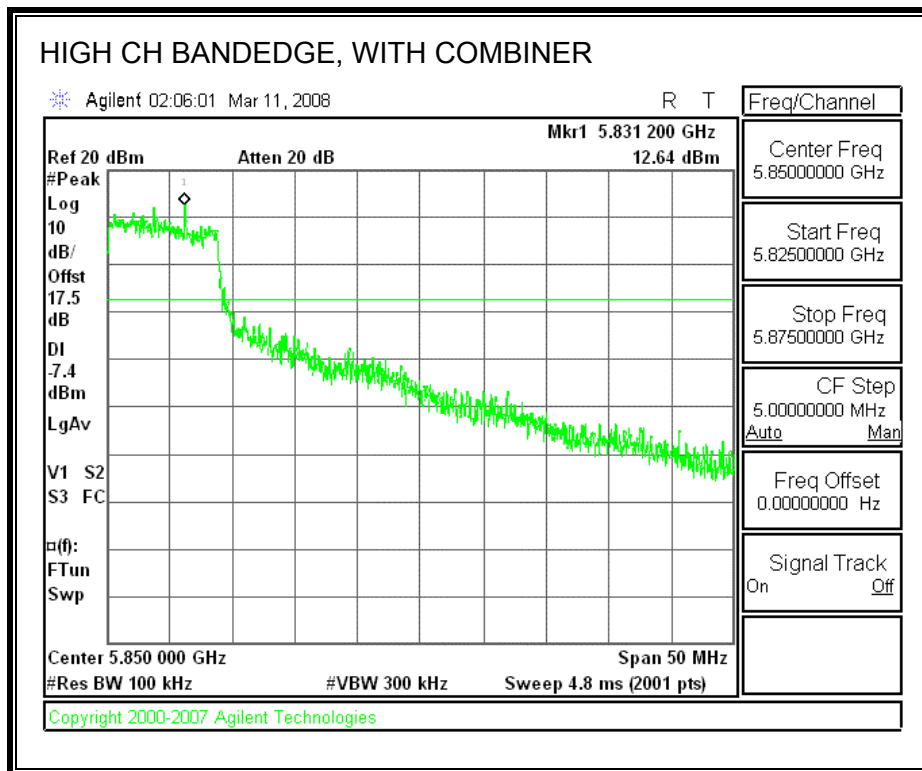
**SPURIOUS EMISSIONS WITH COMBINER**

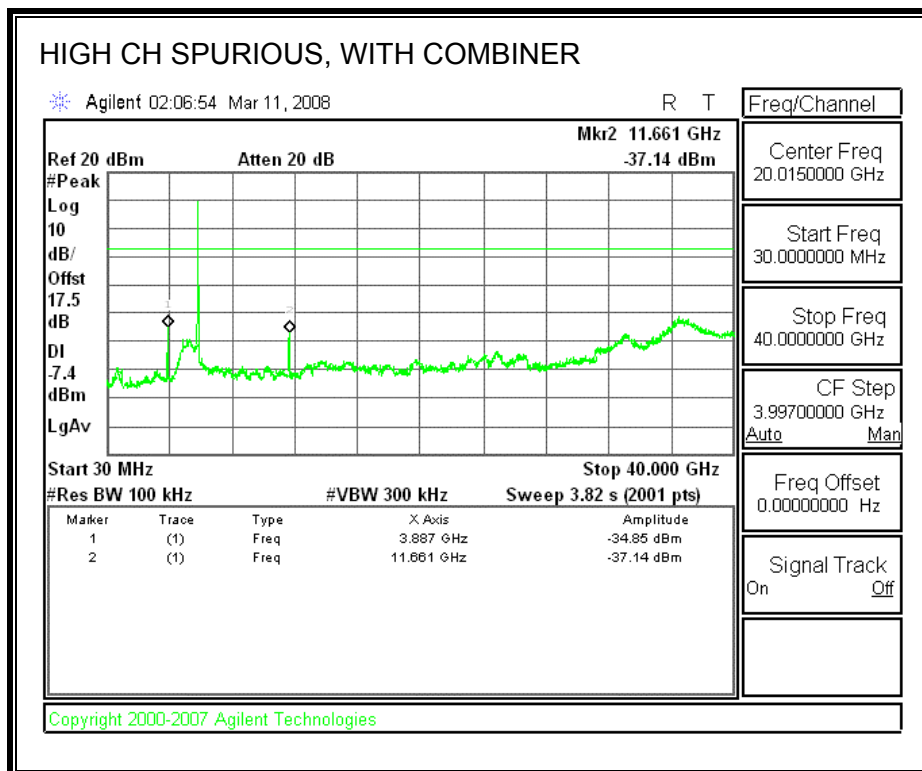












## **7.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND**

### **7.7.1. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

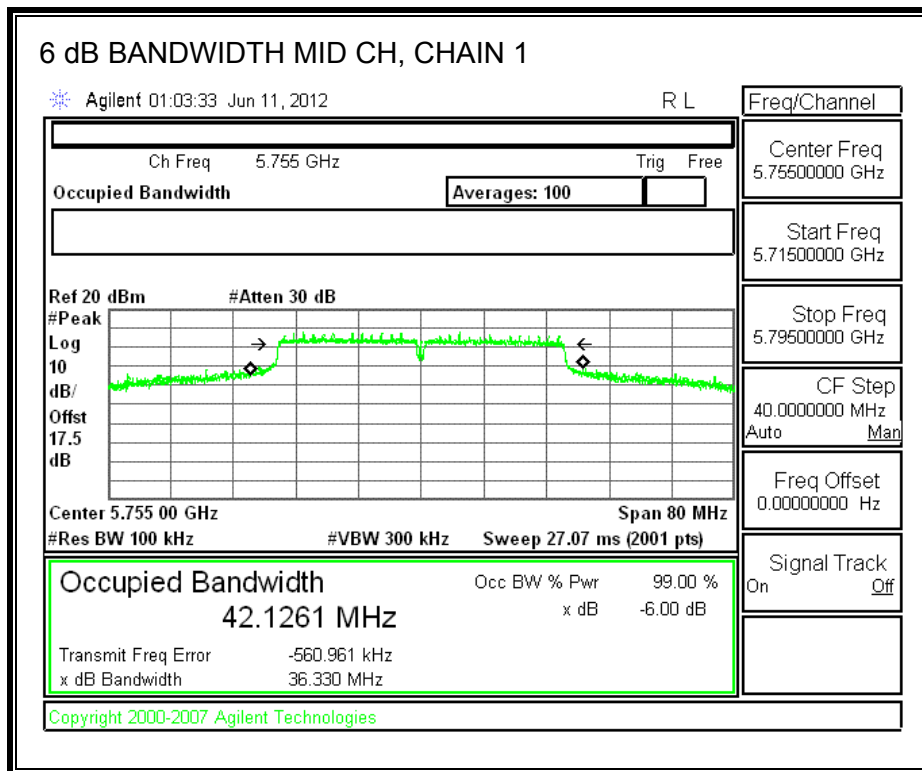
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **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**

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Chain 1<br/>(MHz)</b> | <b>Minimum Limit<br/>(MHz)</b> |
|----------------|----------------------------|--------------------------|--------------------------------|
| Middle         | 5795                       | 36.33                    | 0.5                            |



## 7.7.2. 99% BANDWIDTH

### LIMITS

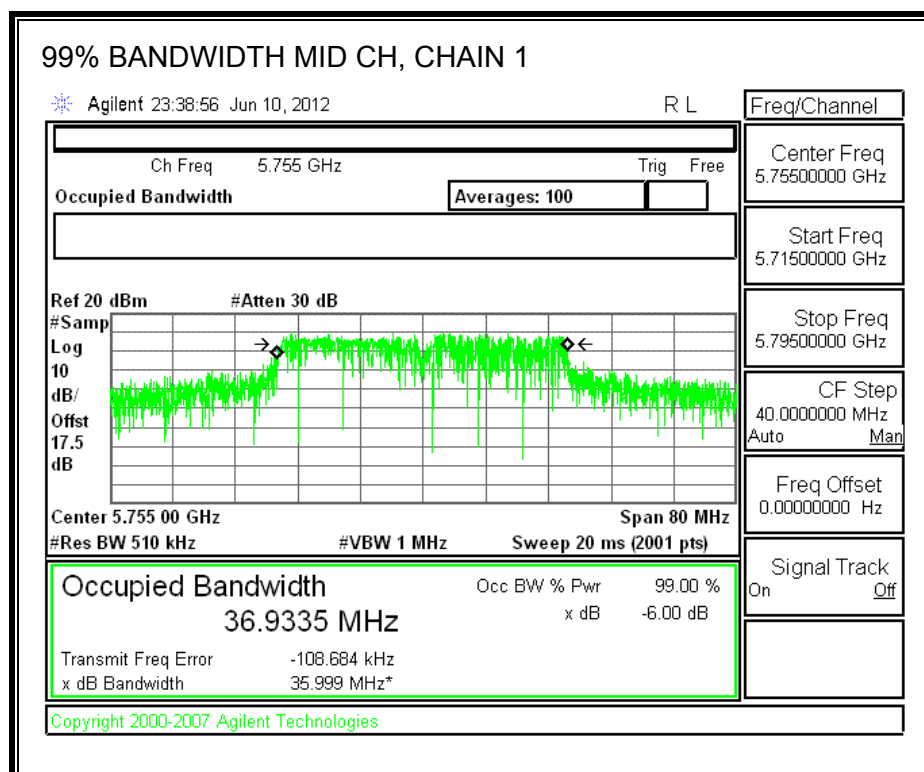
None; for reporting purposes only.

### 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<br>(MHz) | Chain 1<br>99% Bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------------|
| Middle  | 5795               | 36.9335                           |



### 7.7.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

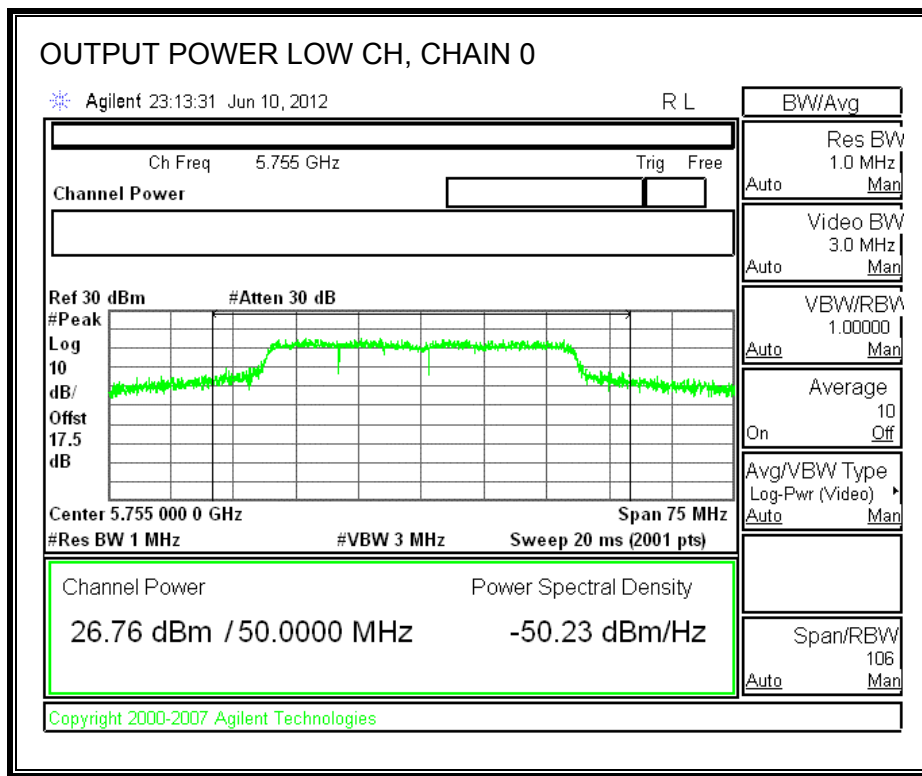
#### TEST PROCEDURE

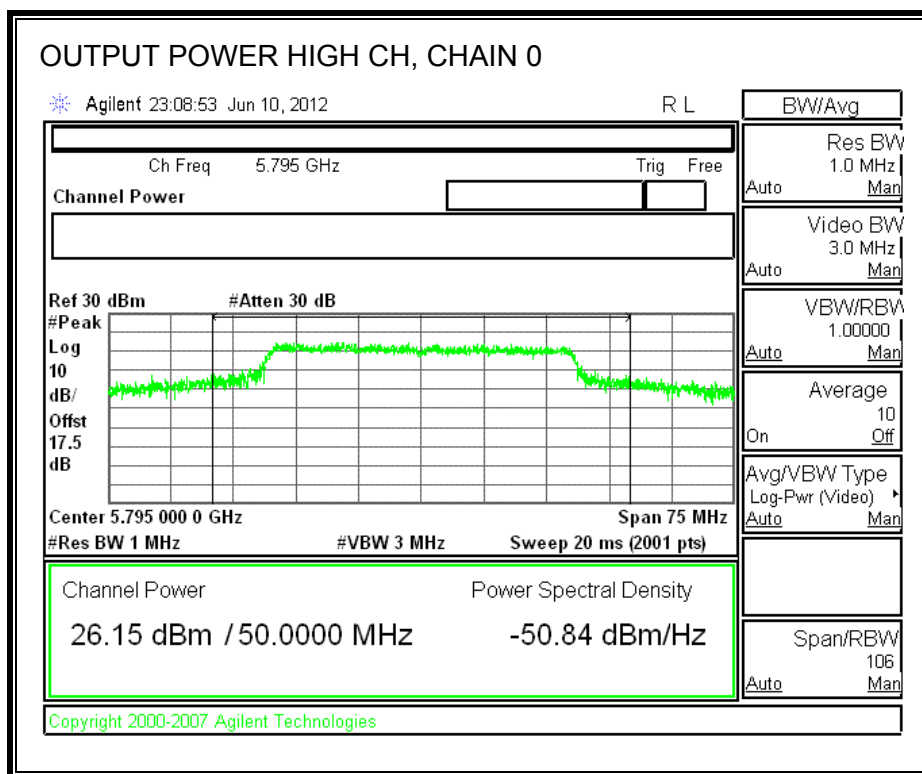
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

#### RESULTS

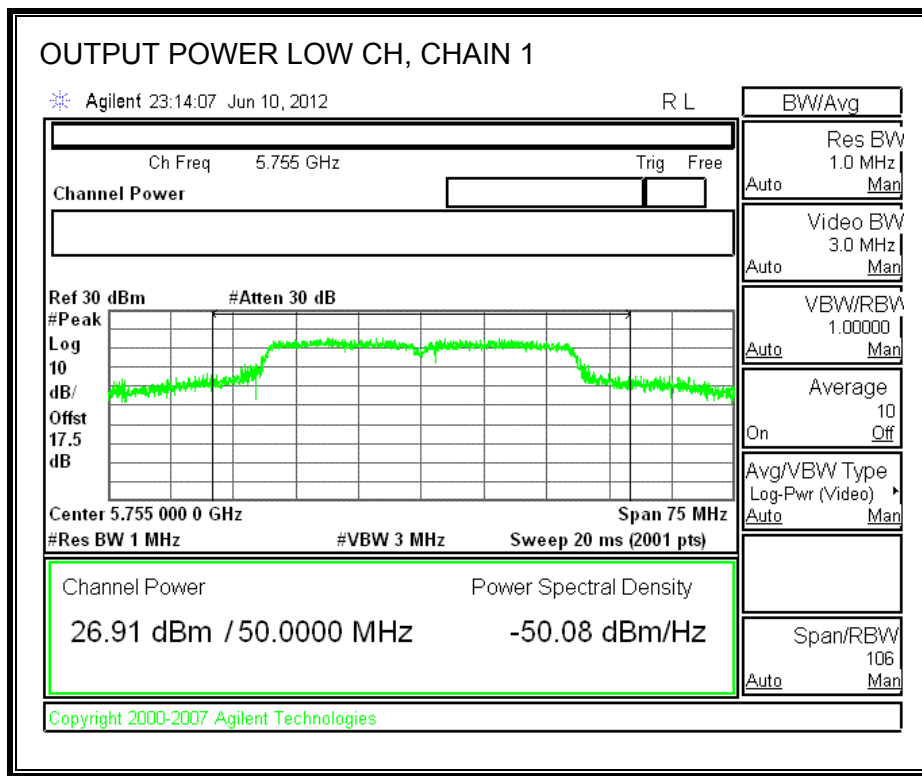
| Channel | Frequency<br>(MHz) | Limit<br>(dBm) | Chain 0<br>Power<br>(dBm) | Chain 1<br>Power<br>(dBm) | Total<br>Power<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------|---------------------------|---------------------------|-------------------------|----------------|
| Low     | 5755               | 30.00          | 26.76                     | 26.91                     | 29.85                   | -0.15          |
| High    | 5795               | 30.00          | 26.15                     | 26.76                     | 29.48                   | -0.52          |

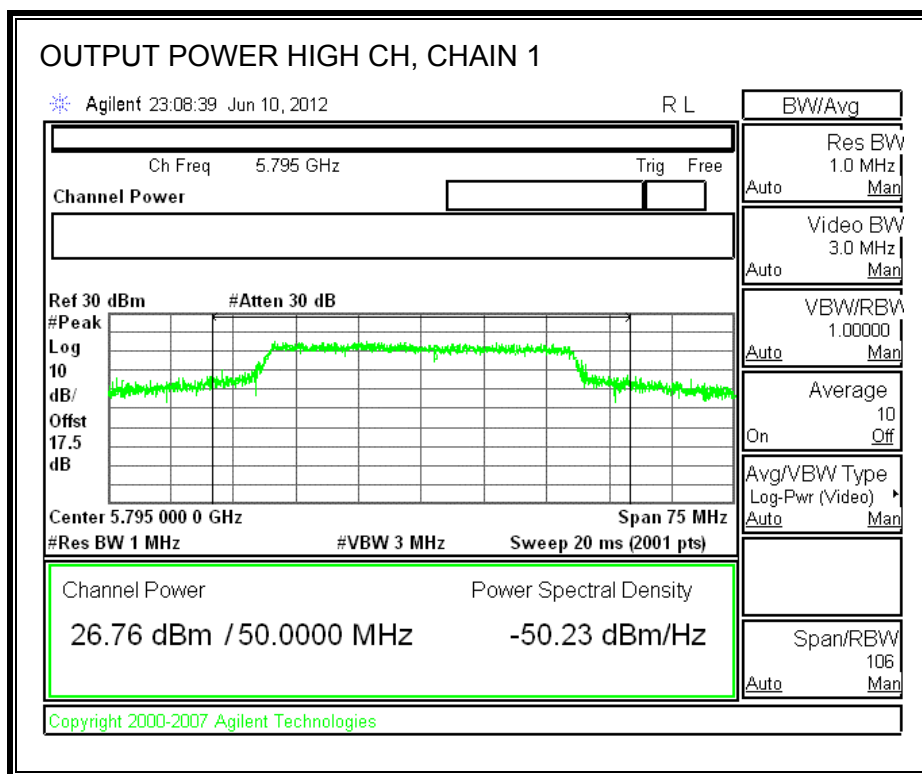
**CHAIN 0 OUTPUT POWER**





**CHAIN 1 OUTPUT POWER**





#### **7.7.4. AVERAGE POWER**

##### **LIMITS**

None; for reporting purposes only.

##### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

##### **RESULTS**

The cable assembly insertion loss of 17.5 dB (including 16 dB pad and 1.5 dB cable) entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Chain 0 Power<br>(dBm) | Chain 1 Power<br>(dBm) | Total Power<br>(dBm) |
|---------|--------------------|------------------------|------------------------|----------------------|
| Low     | 5755               | 19.93                  | 20.11                  | 23.03                |
| High    | 5795               | 19.48                  | 20.03                  | 22.77                |

## 7.7.5. 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.

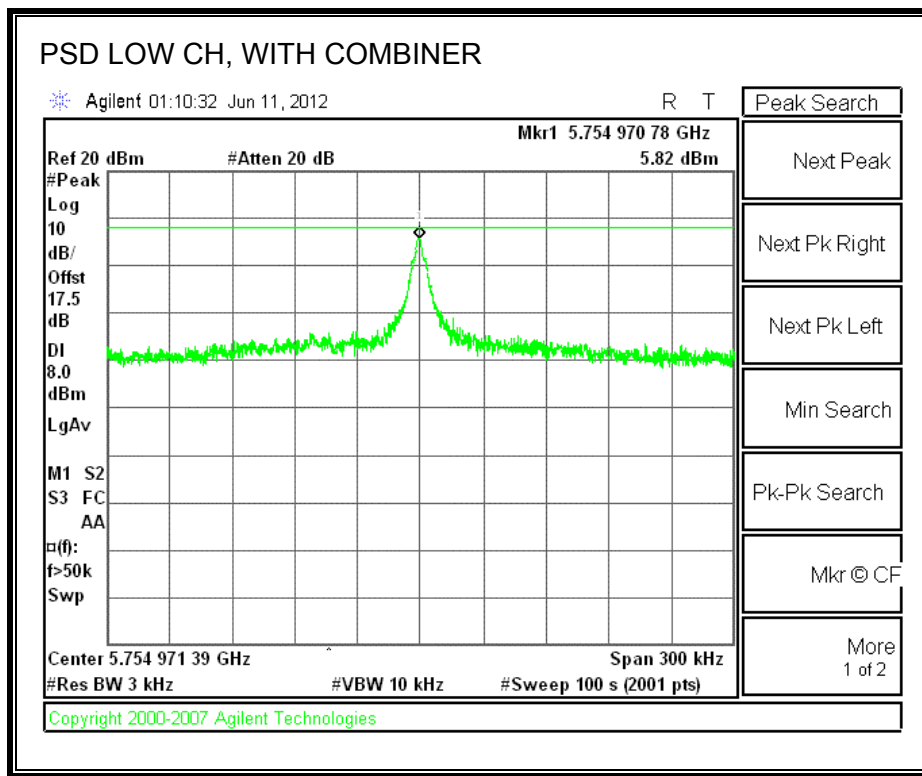
### TEST PROCEDURE

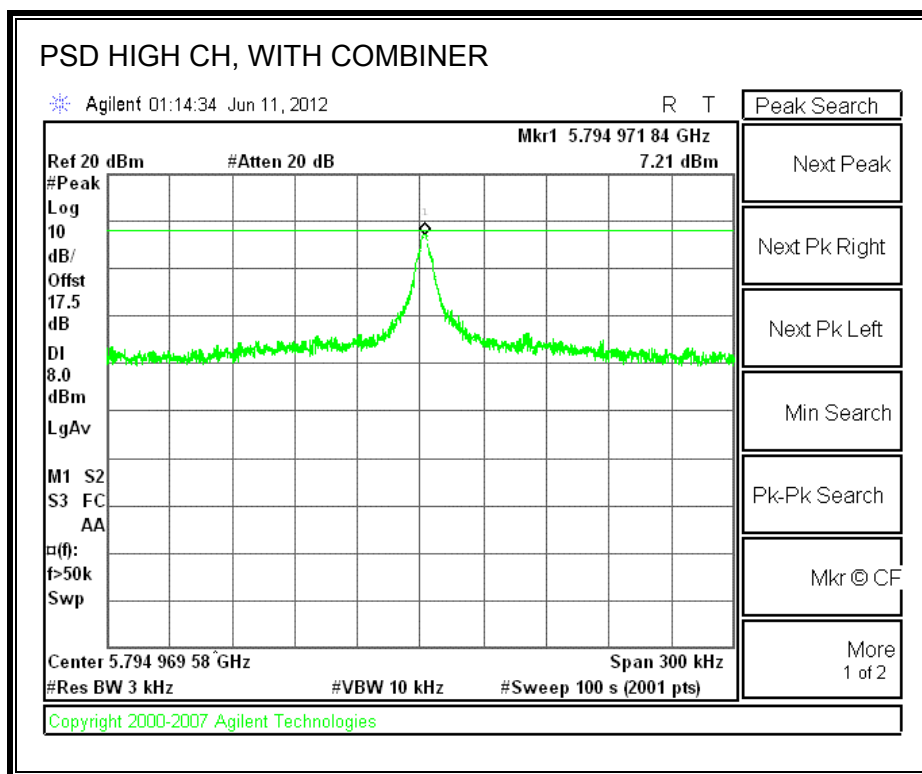
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### RESULTS:

| Channel | Frequency<br>(MHz) | PSD with Combiner<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|----------------------------|----------------|----------------|
| Low     | 5755               | 5.82                       | 8              | -2.18          |
| High    | 5795               | 7.21                       | 8              | -0.79          |

**POWER SPECTRAL DENSITY, WITH COMBINER**





## **7.7.6. 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.

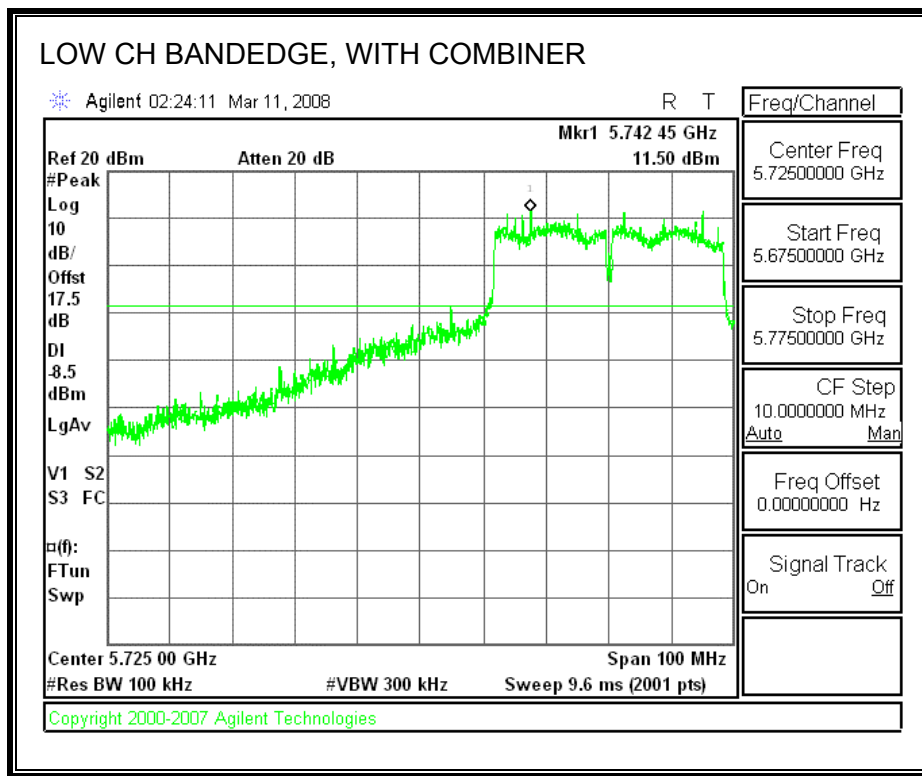
### **TEST PROCEDURE**

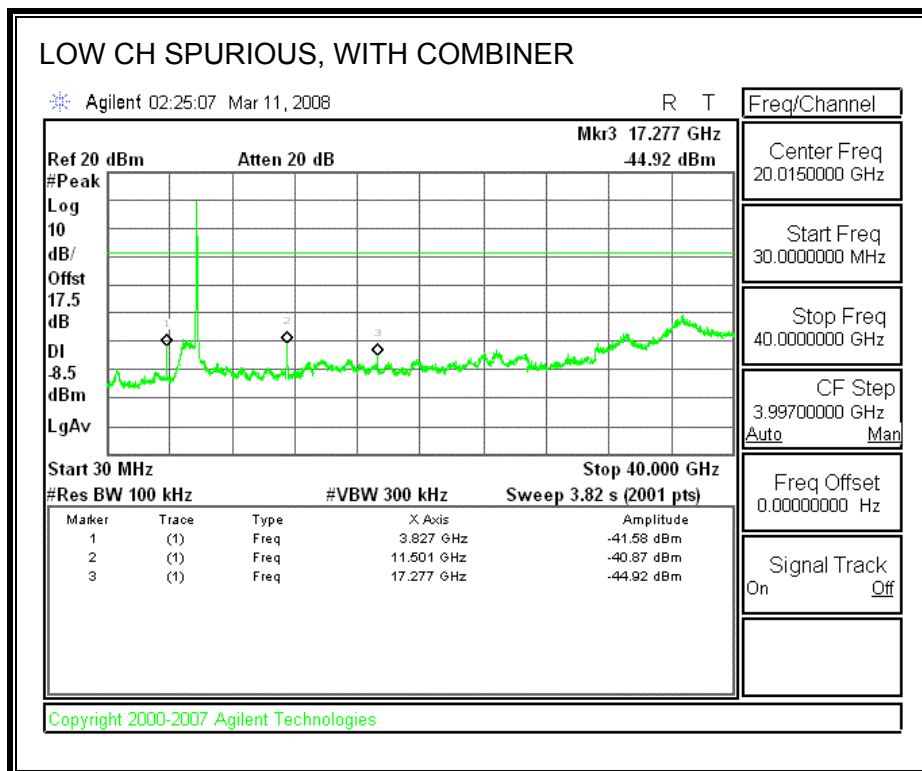
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

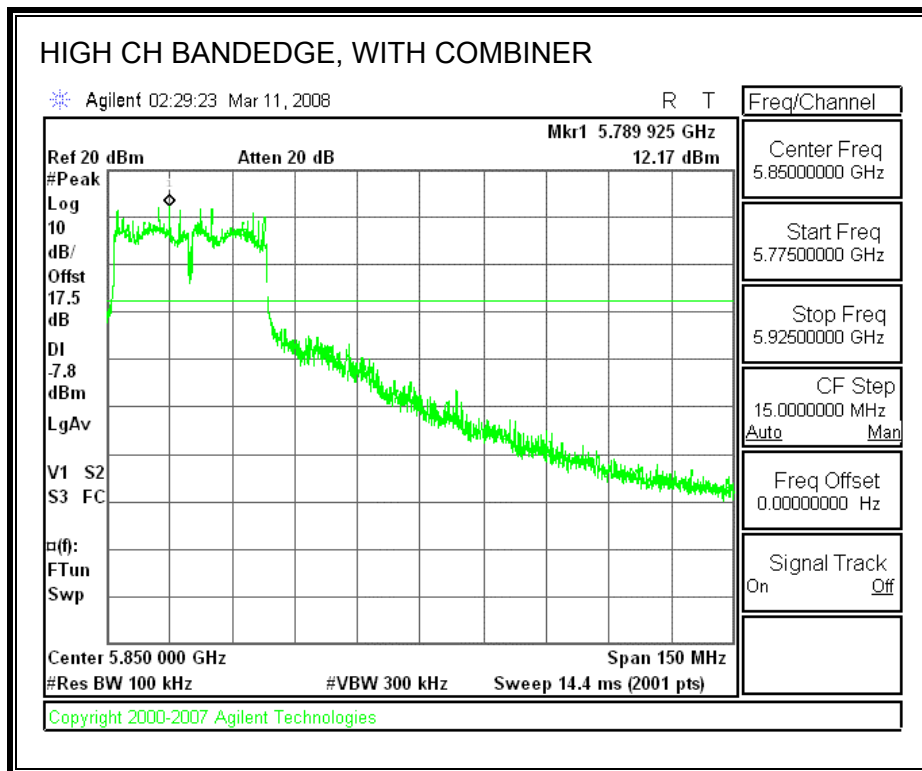
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest and highest channels.

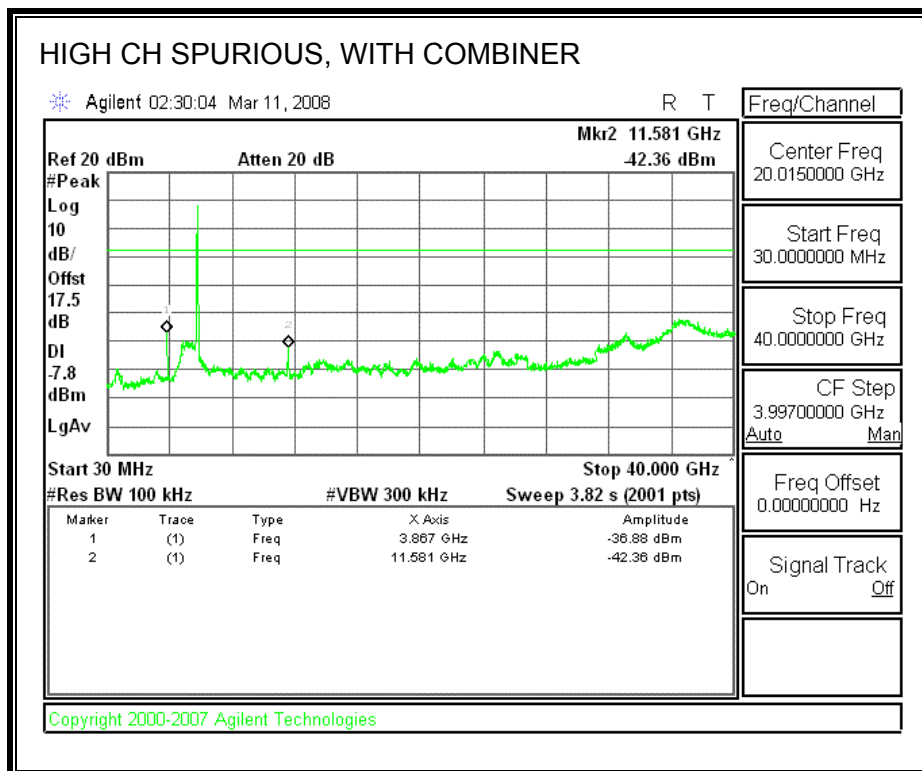
### **RESULTS**

**SPURIOUS EMISSIONS WITH COMBINER**









## 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<br>(MHz) | Field Strength Limit<br>(uV/m) at 3 m | Field Strength Limit<br>(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.

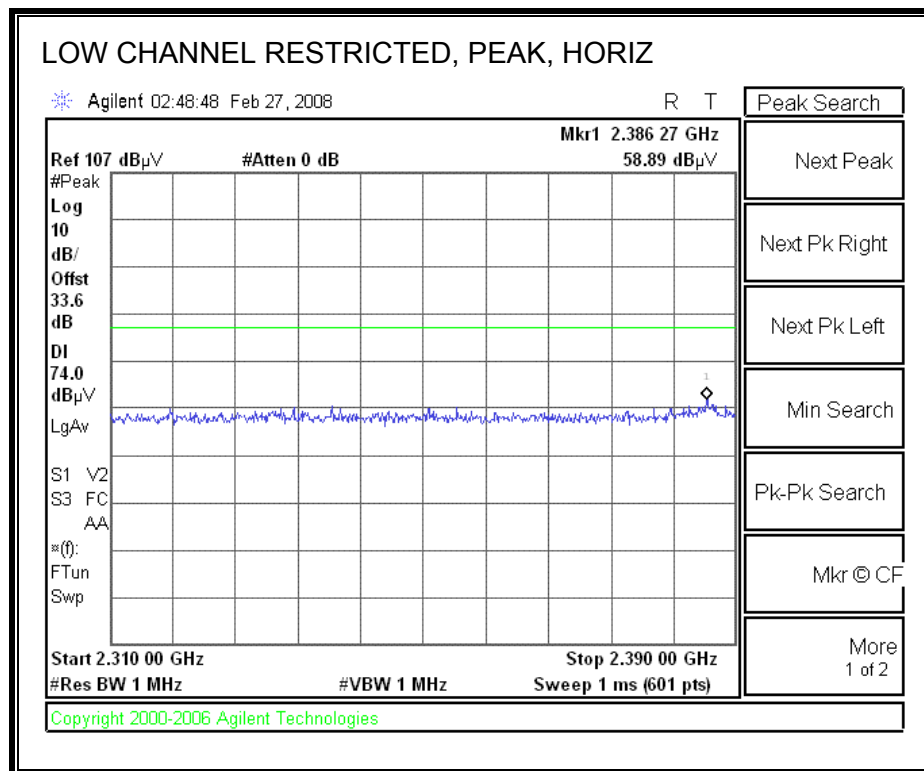
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

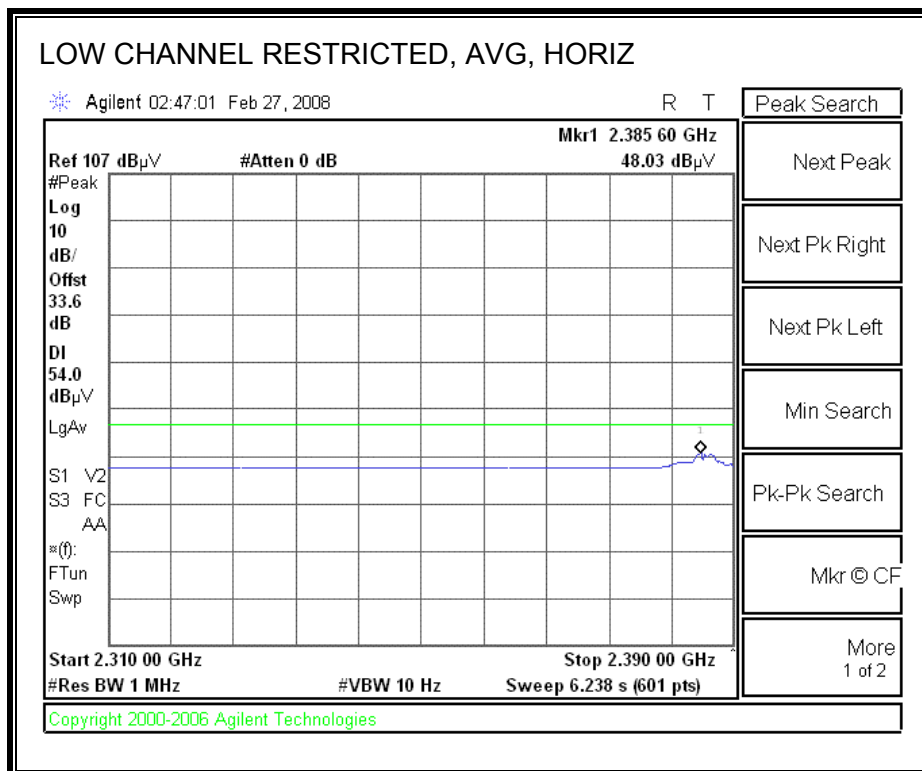
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 8.2. TRANSMITTER ABOVE 1 GHz

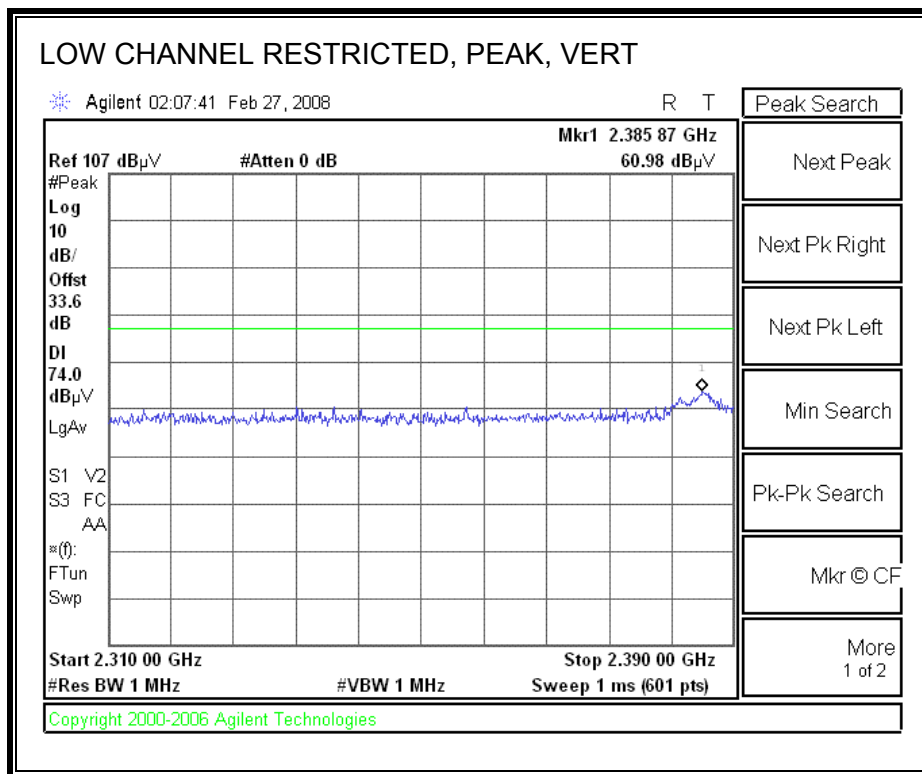
### 8.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

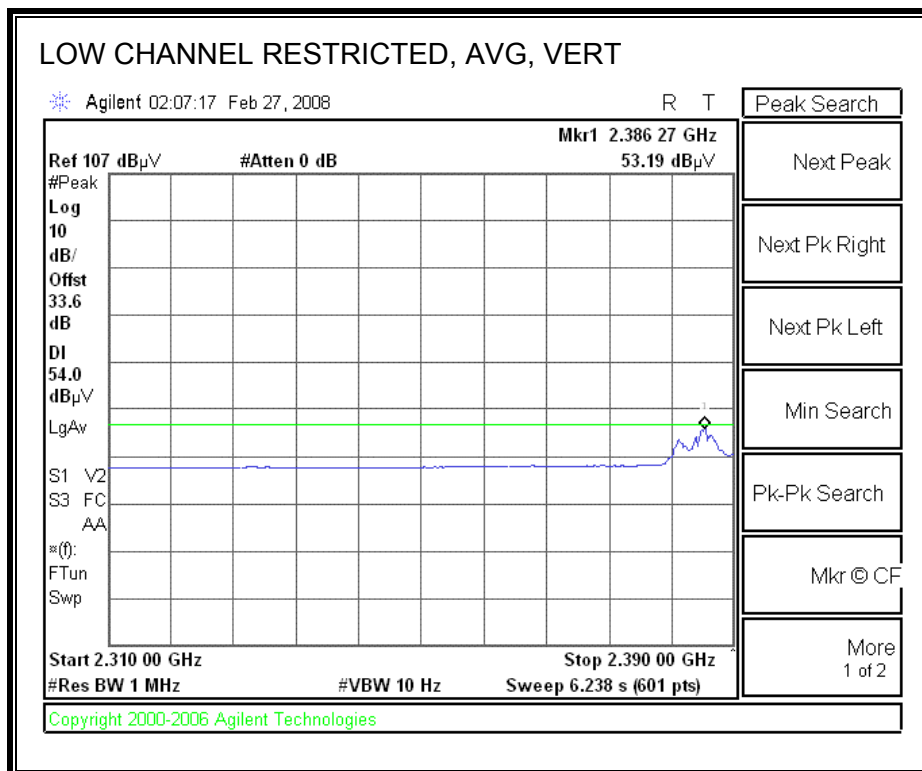
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



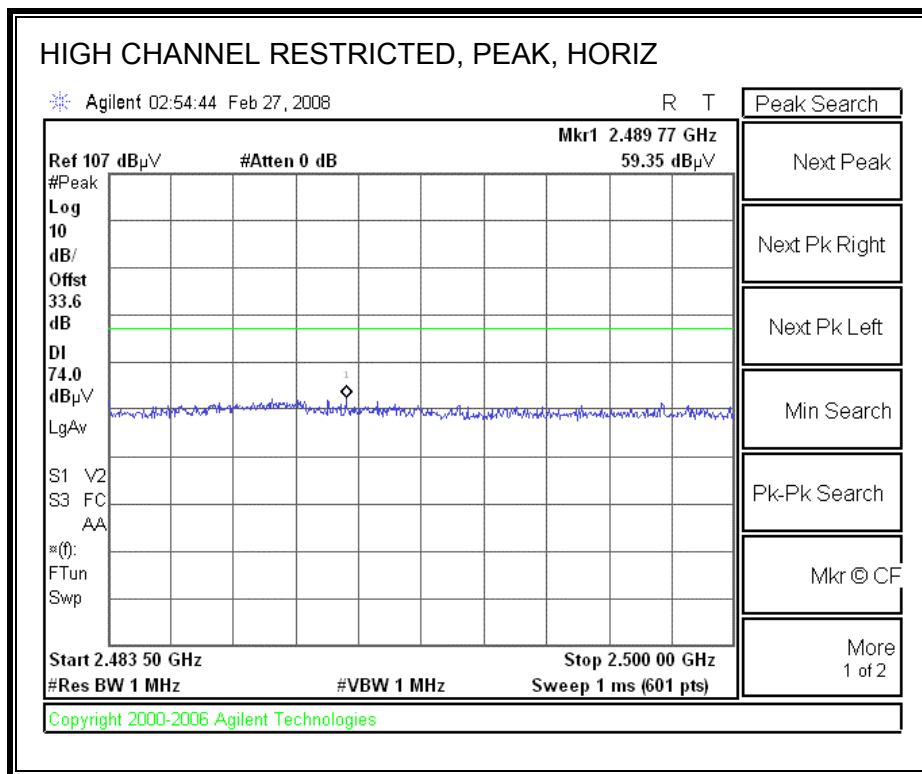


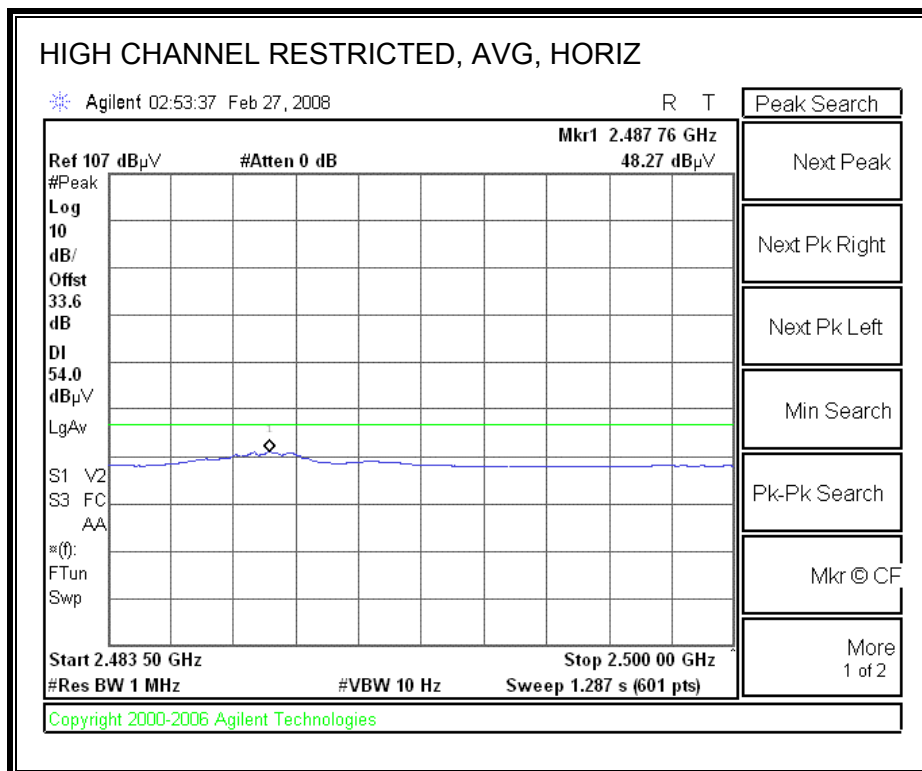
**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**



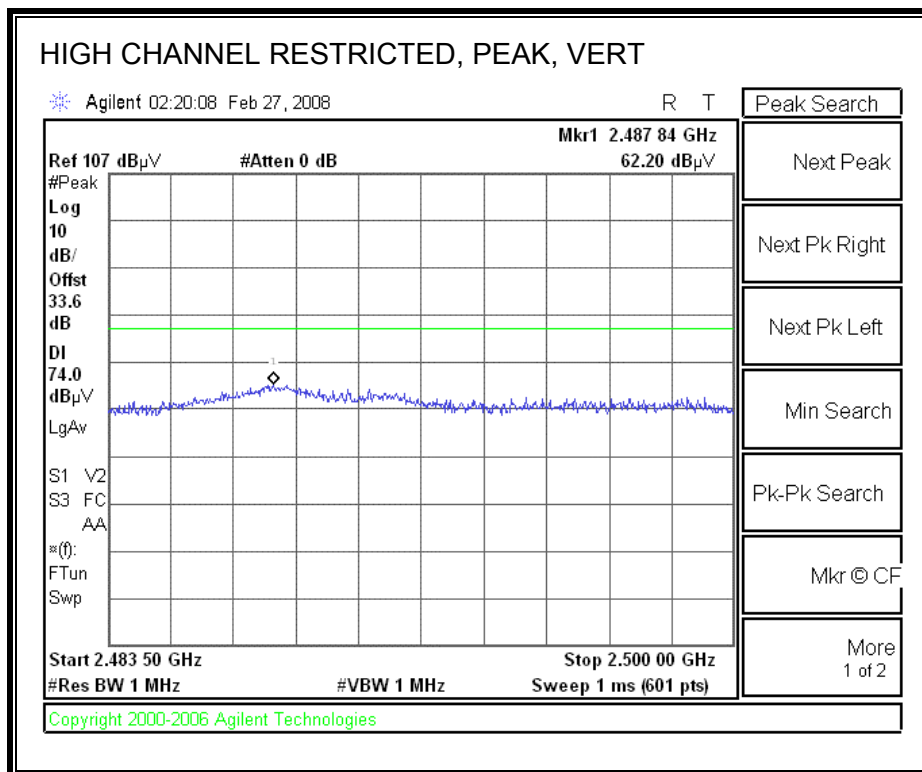


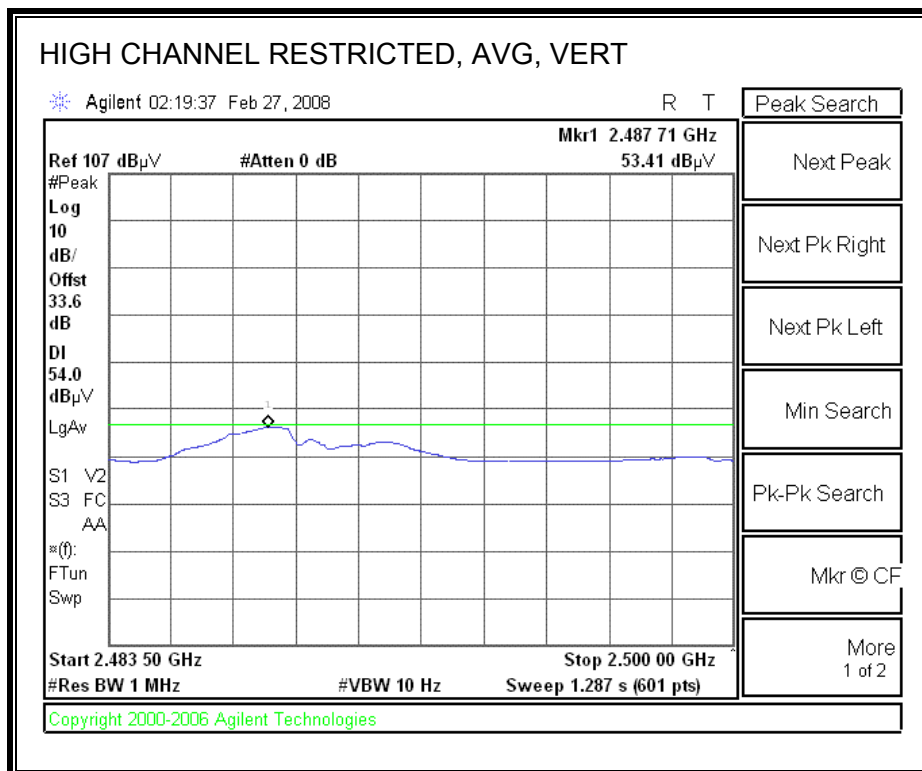
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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



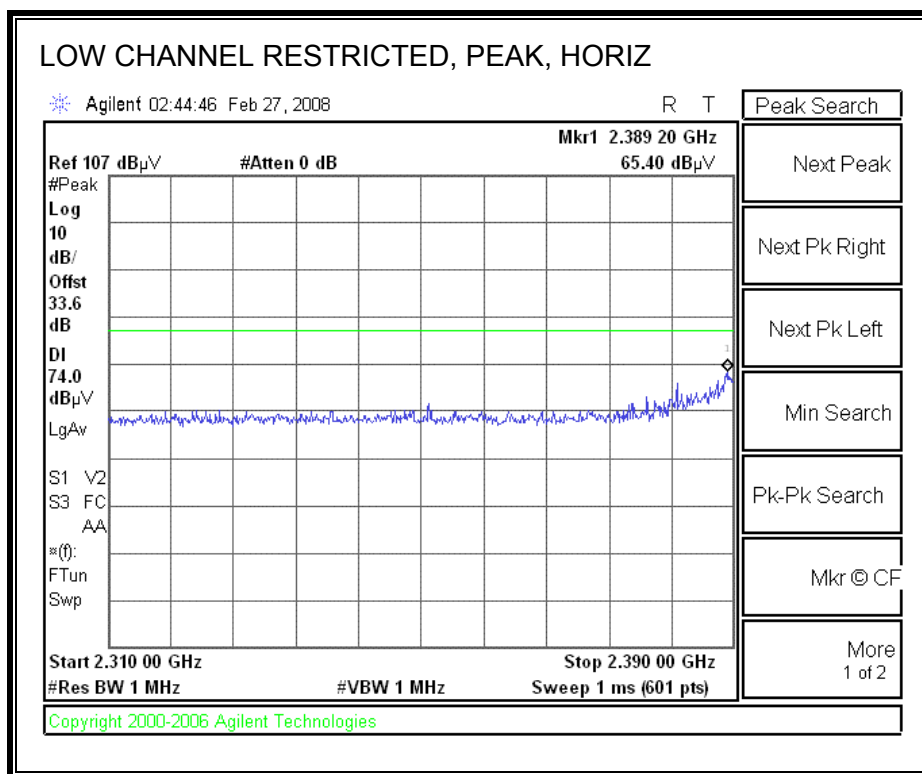


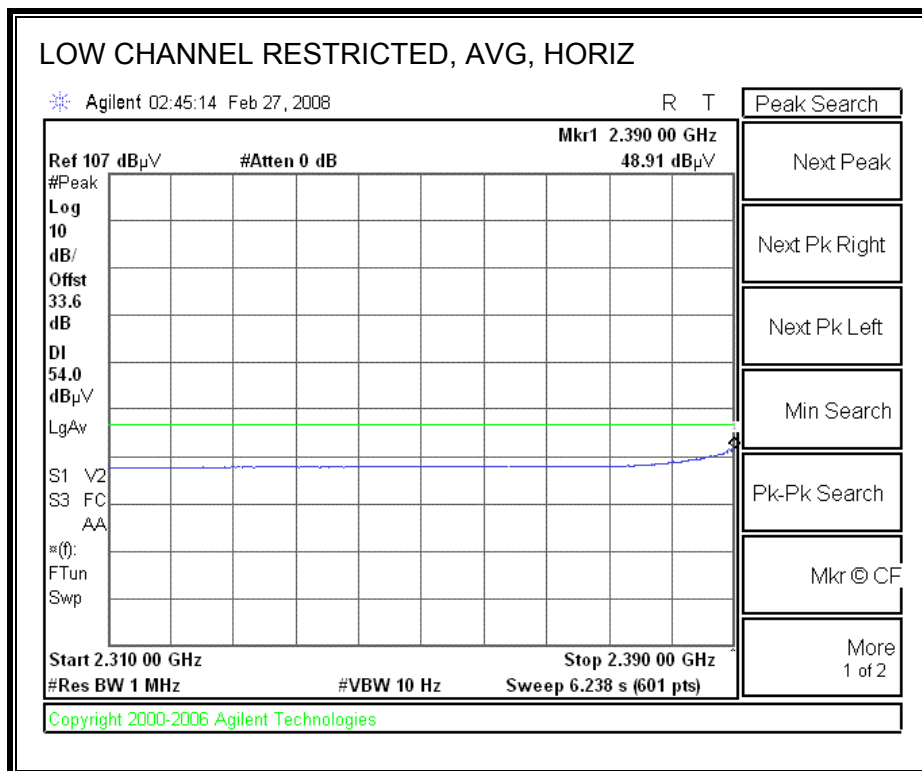
# **HARMONICS AND SPURIOUS EMISSIONS**

| High Frequency Measurement                                                                                                                                                        |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-------------------|--------------------------------|----------|--------------|--------------|------------------------------|----------------|----------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber                                                                                                                             |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| Company: Atheros<br>Project #: 08U11571<br>Date: 2/26/2008<br>Test Engineer: Chin Pang<br>Configuration: EUT/Antenna/Laptop<br>Mode: b mode, TX<br>S/N: HB92-031-S-0805<br>FEM #1 |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| Test Equipment:                                                                                                                                                                   |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| Horn 1-18GHz                                                                                                                                                                      |                       | Pre-amplifier 1-26GHz |                   | Pre-amplifier 26-40GHz         |          | Horn > 18GHz |              | Limit                        |                |                                                                                  |                  |                   |              |               |                |
| T73; S/N: 6717 @3m                                                                                                                                                                |                       | T34 HP 8449B          |                   |                                |          |              |              | FCC 15.209                   |                |                                                                                  |                  |                   |              |               |                |
| Hi Frequency Cables                                                                                                                                                               |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| 2 foot cable                                                                                                                                                                      |                       | 3 foot cable          |                   | 12 foot cable                  |          | HPF          |              | Reject Filter                |                | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |                  |                   |              |               |                |
|                                                                                                                                                                                   |                       |                       |                   | A-5m Chamber                   |          |              |              | R_001                        |                |                                                                                  |                  |                   |              |               |                |
| f<br>GHz                                                                                                                                                                          | Dist<br>(m)           | Read Pk<br>dBuV       | Read Avg.<br>dBuV | AF<br>dB/m                     | CL<br>dB | Amp<br>dB    | D Corr<br>dB | Filtr<br>dB                  | Peak<br>dBuV/m | Avg<br>dBuV/m                                                                    | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
| Low Ch (2412MHz)                                                                                                                                                                  |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| 3.216                                                                                                                                                                             | 3.0                   | 42.0                  | 30.2              | 30.5                           | 5.5      | -35.7        | 0.0          | 0.0                          | 42.3           | 30.5                                                                             | 74               | 54                | -31.7        | -23.5         | V              |
| 4.824                                                                                                                                                                             | 3.0                   | 49.0                  | 47.0              | 33.3                           | 6.9      | -34.8        | 0.0          | 0.0                          | 54.4           | 52.4                                                                             | 74               | 54                | -19.6        | -1.6          | V              |
| 7.326                                                                                                                                                                             | 3.0                   | 45.0                  | 36.0              | 35.0                           | 8.4      | -34.1        | 0.0          | 0.0                          | 54.3           | 45.3                                                                             | 74               | 54                | -19.7        | -8.7          | V              |
| Mid Ch (2437MHz)                                                                                                                                                                  |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| 3.249                                                                                                                                                                             | 3.0                   | 42.0                  | 30.2              | 30.6                           | 5.5      | -35.7        | 0.0          | 0.0                          | 42.5           | 30.7                                                                             | 74               | 54                | -31.5        | -23.3         | V              |
| 4.874                                                                                                                                                                             | 3.0                   | 49.5                  | 48.0              | 33.4                           | 6.9      | -34.8        | 0.0          | 0.0                          | 55.0           | 53.5                                                                             | 74               | 54                | -19.0        | -0.5          | V              |
| 4.874                                                                                                                                                                             | 3.0                   | 50.9                  | 47.6              | 33.4                           | 6.9      | -34.8        | 0.0          | 0.0                          | 56.3           | 53.1                                                                             | 74               | 54                | -17.7        | -0.9          | V              |
| 7.311                                                                                                                                                                             | 3.0                   | 43.0                  | 33.2              | 35.0                           | 8.4      | -34.1        | 0.0          | 0.0                          | 52.3           | 42.5                                                                             | 74               | 54                | -21.7        | -11.5         | V              |
| High Ch (2462MHz)                                                                                                                                                                 |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| 3.283                                                                                                                                                                             | 3.0                   | 41.6                  | 29.5              | 30.7                           | 5.6      | -35.6        | 0.0          | 0.0                          | 42.2           | 30.1                                                                             | 74               | 54                | -31.8        | -23.9         | V              |
| 4.924                                                                                                                                                                             | 3.0                   | 49.2                  | 47.5              | 33.4                           | 7.0      | -34.8        | 0.0          | 0.0                          | 54.8           | 53.1                                                                             | 74               | 54                | -19.2        | -0.9          | V              |
| 7.386                                                                                                                                                                             | 3.0                   | 43.5                  | 33.5              | 35.0                           | 8.4      | -34.1        | 0.0          | 0.0                          | 52.9           | 42.9                                                                             | 74               | 54                | -21.1        | -11.1         | V              |
| Rev. 4127                                                                                                                                                                         |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| Note: No other emissions were detected above the system noise floor.                                                                                                              |                       |                       |                   |                                |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |
| f                                                                                                                                                                                 | Measurement Frequency |                       | Amp               | Preamp Gain                    |          | Avg Lim      |              | Average Field Strength Limit |                |                                                                                  |                  |                   |              |               |                |
| Dist                                                                                                                                                                              | Distance to Antenna   |                       | D Corr            | Distance Correct to 3 meters   |          | Pk Lim       |              | Peak Field Strength Limit    |                |                                                                                  |                  |                   |              |               |                |
| Read                                                                                                                                                                              | Analyzer Reading      |                       | Avg               | Average Field Strength @ 3 m   |          | Avg Mar      |              | Margin vs. Average Limit     |                |                                                                                  |                  |                   |              |               |                |
| AF                                                                                                                                                                                | Antenna Factor        |                       | Peak              | Calculated Peak Field Strength |          | Pk Mar       |              | Margin vs. Peak Limit        |                |                                                                                  |                  |                   |              |               |                |
| CL                                                                                                                                                                                | Cable Loss            |                       | HPF               | High Pass Filter               |          |              |              |                              |                |                                                                                  |                  |                   |              |               |                |

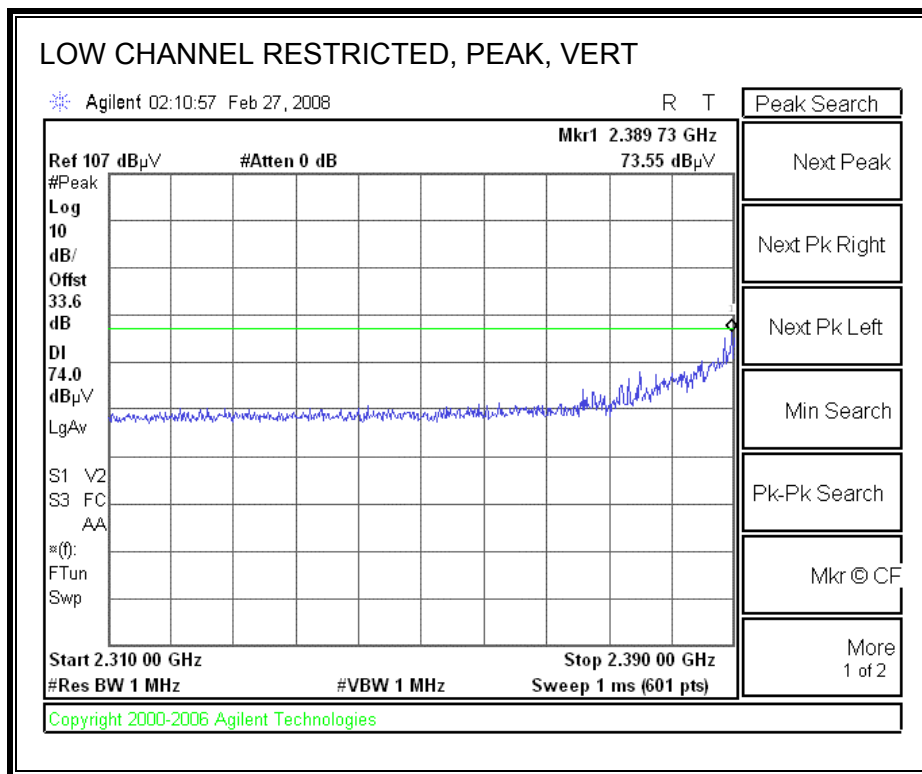
## 8.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

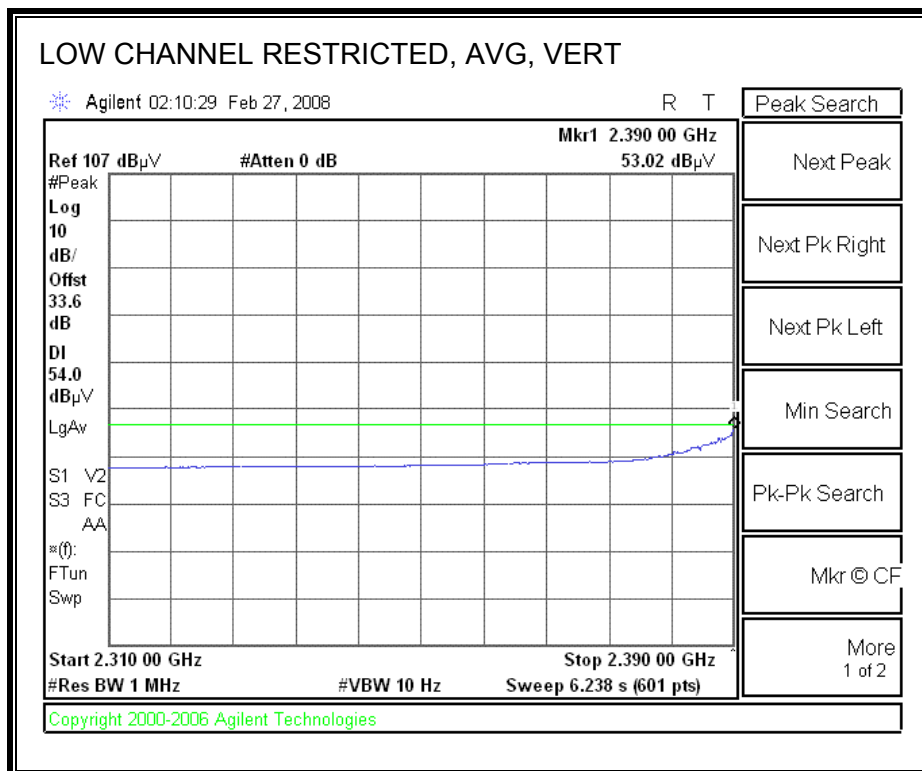
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



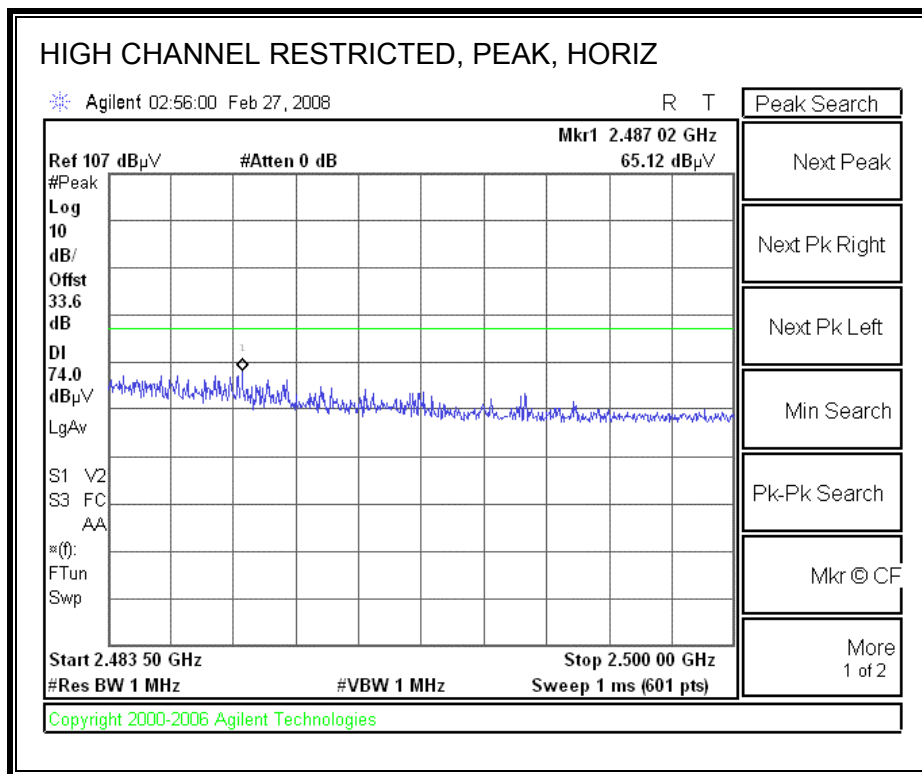


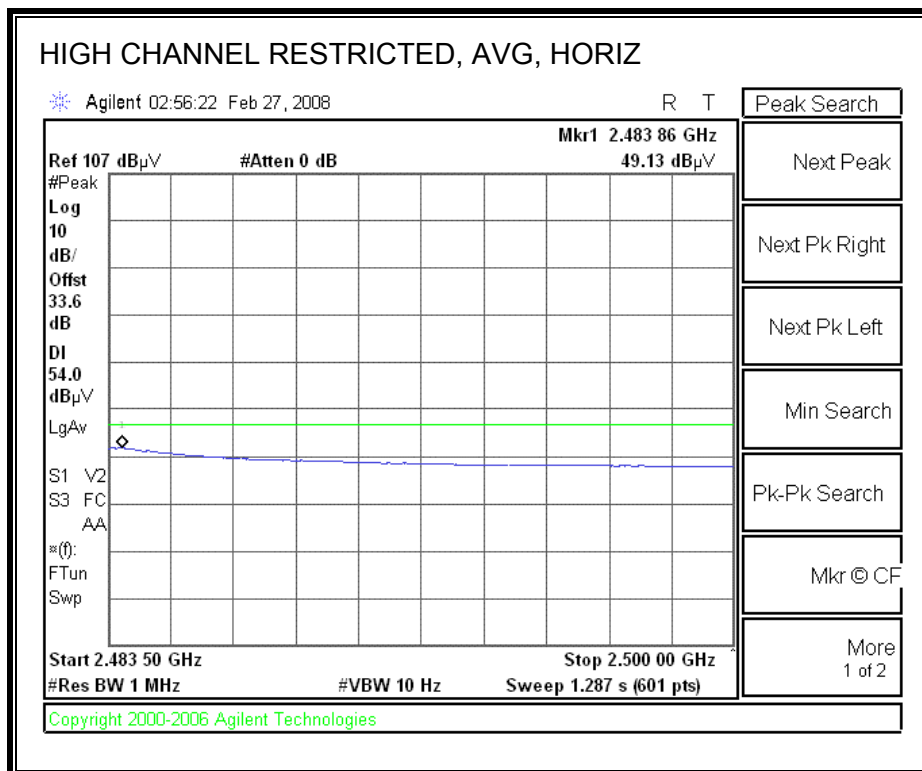
**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**



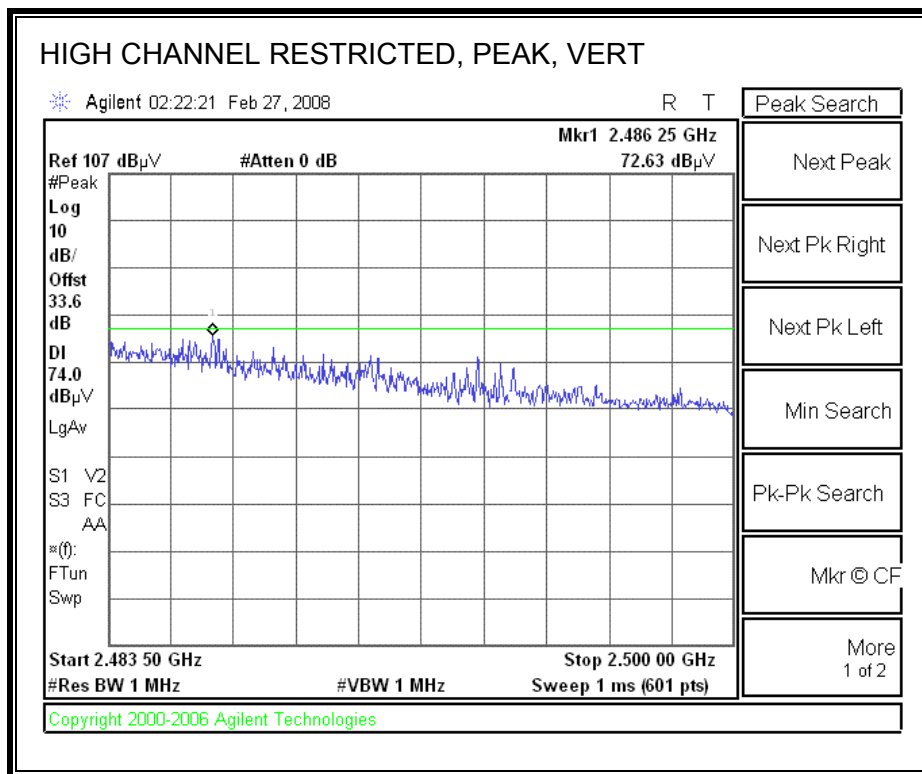


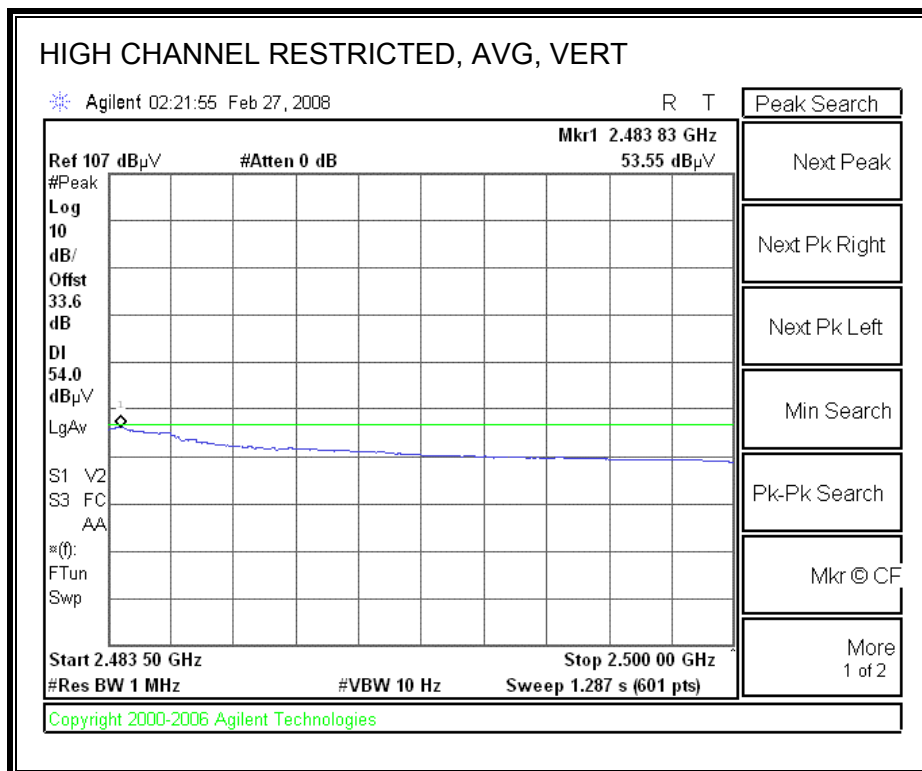
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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



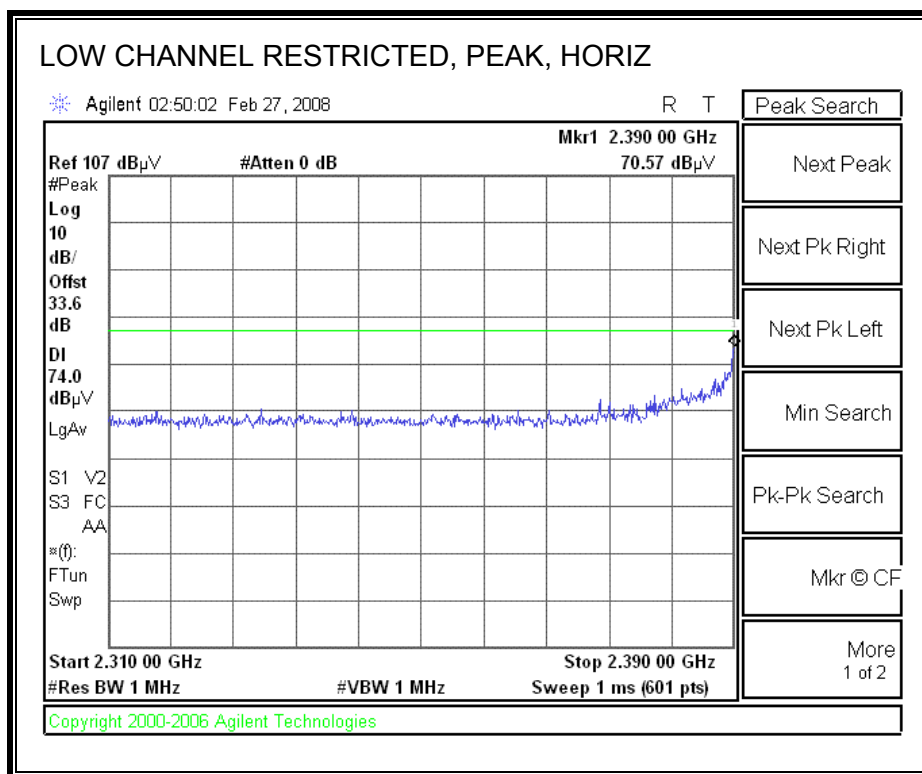


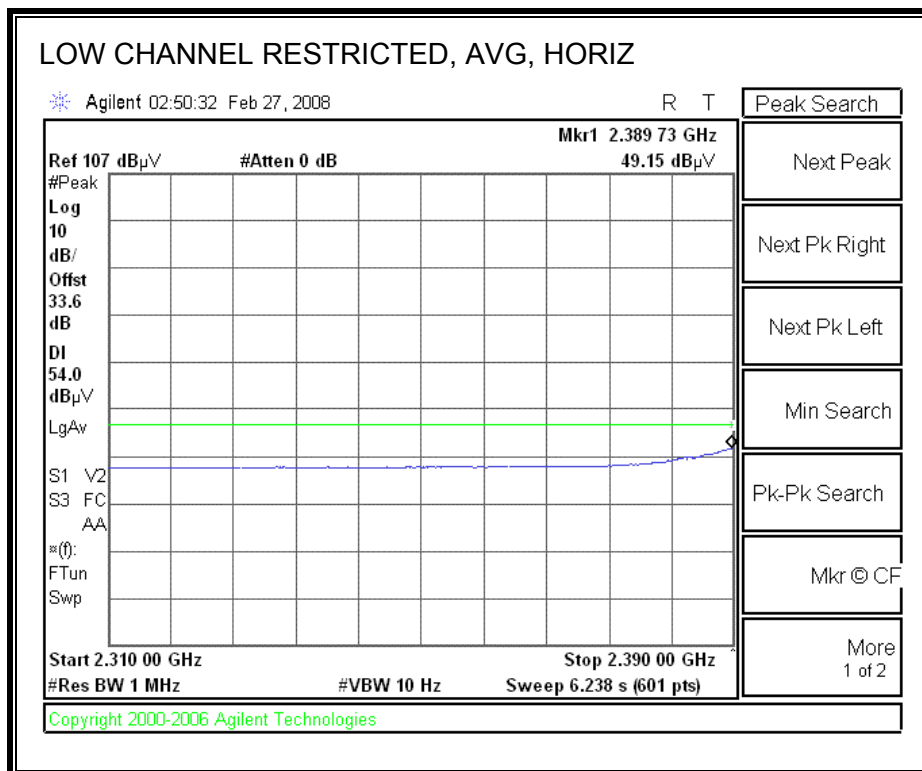
## HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                                                                                                                                        |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------|------------------------|-----|--------------|--------------------------------|---------------|--------|---------------------------------------------------------------------------------|--------|---------|------------------------------|---------|-------|--|--|
| Compliance Certification Services, Fremont 5m Chamber                                                                                                                             |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| Company: Atheros<br>Project #: 08U11571<br>Date: 2/27/2008<br>Test Engineer: Chin Pang<br>Configuration: EUT/Antenna/Laptop<br>Mode: g Mode, TX<br>S/N: HB92-031-S-0805<br>FEM #1 |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| Test Equipment:                                                                                                                                                                   |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| Horn 1-18GHz                                                                                                                                                                      |                       | Pre-amplifier 1-26GHz |          | Pre-amplifier 26-40GHz |     | Horn > 18GHz |                                | Limit         |        |                                                                                 |        |         |                              |         |       |  |  |
| T73; S/N: 6717 @3m                                                                                                                                                                |                       | T34 HP 8449B          |          |                        |     |              |                                | FCC 15.209    |        |                                                                                 |        |         |                              |         |       |  |  |
| Hi Frequency Cables                                                                                                                                                               |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| 2 foot cable                                                                                                                                                                      |                       | 3 foot cable          |          | 12 foot cable          |     | HPF          |                                | Reject Filter |        | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz; VBW=10Hz |        |         |                              |         |       |  |  |
|                                                                                                                                                                                   |                       |                       |          | A-5m Chamber           |     |              |                                | R_001         |        |                                                                                 |        |         |                              |         |       |  |  |
| f                                                                                                                                                                                 | Dist                  | Read Pk               | Read Avg | AF                     | CL  | Amp          | D Corr                         | Fldr          | Peak   | Avg                                                                             | Pk Lim | Avg Lim | Pk Mar                       | Avg Mar | Notes |  |  |
| GHz                                                                                                                                                                               | (m)                   | dBuV                  | dBuV     | dB/m                   | dB  | dB           | dB                             | dB            | dBuV/m | dBuV/m                                                                          | dBuV/m | dBuV/m  | dB                           | dB      | (V/H) |  |  |
| <b>Low Ch (2412MHz)</b>                                                                                                                                                           |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| 3.216                                                                                                                                                                             | 3.0                   | 44.0                  | 36.0     | 30.5                   | 5.5 | -35.7        | 0.0                            | 0.0           | 44.3   | 36.3                                                                            | 74     | 54      | -29.7                        | -17.7   | V     |  |  |
| 4.824                                                                                                                                                                             | 3.0                   | 46.7                  | 34.0     | 33.3                   | 6.9 | -34.8        | 0.0                            | 0.0           | 52.1   | 39.4                                                                            | 74     | 54      | -21.9                        | -14.6   | V     |  |  |
| 7.326                                                                                                                                                                             | 3.0                   | 45.0                  | 30.0     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 54.3   | 39.3                                                                            | 74     | 54      | -19.7                        | -14.7   | V     |  |  |
| 3.216                                                                                                                                                                             | 3.0                   | 44.7                  | 37.5     | 30.5                   | 5.5 | -35.7        | 0.0                            | 0.0           | 45.0   | 37.8                                                                            | 74     | 54      | -29.0                        | -16.2   | H     |  |  |
| 4.824                                                                                                                                                                             | 3.0                   | 43.9                  | 32.0     | 33.3                   | 6.9 | -34.8        | 0.0                            | 0.0           | 49.3   | 37.4                                                                            | 74     | 54      | -24.7                        | -16.6   | H     |  |  |
| 7.326                                                                                                                                                                             | 3.0                   | 42.3                  | 29.6     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 51.6   | 38.9                                                                            | 74     | 54      | -22.4                        | -15.1   | H     |  |  |
| <b>Mid Ch (2437MHz)</b>                                                                                                                                                           |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| 3.249                                                                                                                                                                             | 3.0                   | 43.0                  | 32.6     | 30.6                   | 5.5 | -35.7        | 0.0                            | 0.0           | 43.5   | 33.1                                                                            | 74     | 54      | -30.5                        | -20.9   | V     |  |  |
| 4.874                                                                                                                                                                             | 3.0                   | 47.1                  | 34.4     | 33.4                   | 6.9 | -34.8        | 0.0                            | 0.0           | 52.6   | 39.9                                                                            | 74     | 54      | -21.4                        | -14.1   | V     |  |  |
| 7.311                                                                                                                                                                             | 3.0                   | 45.6                  | 31.6     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 54.9   | 40.9                                                                            | 74     | 54      | -19.1                        | -13.1   | V     |  |  |
| 3.249                                                                                                                                                                             | 3.0                   | 43.7                  | 33.2     | 30.6                   | 5.5 | -35.7        | 0.0                            | 0.0           | 44.2   | 33.7                                                                            | 74     | 54      | -29.8                        | -20.3   | H     |  |  |
| 4.874                                                                                                                                                                             | 3.0                   | 44.6                  | 32.1     | 33.4                   | 6.9 | -34.8        | 0.0                            | 0.0           | 50.1   | 37.6                                                                            | 74     | 54      | -23.9                        | -16.4   | H     |  |  |
| 7.311                                                                                                                                                                             | 3.0                   | 42.0                  | 30.0     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 51.3   | 39.3                                                                            | 74     | 54      | -22.7                        | -14.7   | H     |  |  |
| <b>High Ch (2462MHz)</b>                                                                                                                                                          |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| 3.283                                                                                                                                                                             | 3.0                   | 43.0                  | 32.0     | 30.7                   | 5.6 | -35.6        | 0.0                            | 0.0           | 43.6   | 32.6                                                                            | 74     | 54      | -30.4                        | -21.4   | V     |  |  |
| 4.924                                                                                                                                                                             | 3.0                   | 46.5                  | 34.4     | 33.4                   | 7.0 | -34.8        | 0.0                            | 0.0           | 52.1   | 40.0                                                                            | 74     | 54      | -21.9                        | -14.0   | V     |  |  |
| 7.386                                                                                                                                                                             | 3.0                   | 46.0                  | 32.0     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 55.4   | 41.4                                                                            | 74     | 54      | -18.6                        | -12.6   | V     |  |  |
| 3.283                                                                                                                                                                             | 3.0                   | 43.4                  | 32.3     | 30.7                   | 5.6 | -35.6        | 0.0                            | 0.0           | 44.0   | 32.9                                                                            | 74     | 54      | -30.0                        | -21.1   | H     |  |  |
| 4.924                                                                                                                                                                             | 3.0                   | 44.7                  | 32.2     | 33.4                   | 7.0 | -34.8        | 0.0                            | 0.0           | 50.3   | 37.8                                                                            | 74     | 54      | -23.7                        | -16.2   | H     |  |  |
| 7.386                                                                                                                                                                             | 3.0                   | 43.8                  | 31.2     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 53.2   | 40.6                                                                            | 74     | 54      | -20.8                        | -13.4   | H     |  |  |
| Rev. 4.12.7                                                                                                                                                                       |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| Note: No other emissions were detected above the system noise floor.                                                                                                              |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |  |  |
| f                                                                                                                                                                                 | Measurement Frequency |                       |          |                        |     | Amp          | Preamp Gain                    |               |        |                                                                                 |        | Avg Lim | Average Field Strength Limit |         |       |  |  |
| Dist                                                                                                                                                                              | Distance to Antenna   |                       |          |                        |     | D Corr       | Distance Correct to 3 meters   |               |        |                                                                                 |        | Pk Lim  | Peak Field Strength Limit    |         |       |  |  |
| Read                                                                                                                                                                              | Analyzer Reading      |                       |          |                        |     | Avg          | Average Field Strength @ 3 m   |               |        |                                                                                 |        | Avg Mar | Margin vs. Average Limit     |         |       |  |  |
| AF                                                                                                                                                                                | Antenna Factor        |                       |          |                        |     | Peak         | Calculated Peak Field Strength |               |        |                                                                                 |        | Pk Mar  | Margin vs. Peak Limit        |         |       |  |  |
| CL                                                                                                                                                                                | Cable Loss            |                       |          |                        |     | HPF          | High Pass Filter               |               |        |                                                                                 |        |         |                              |         |       |  |  |

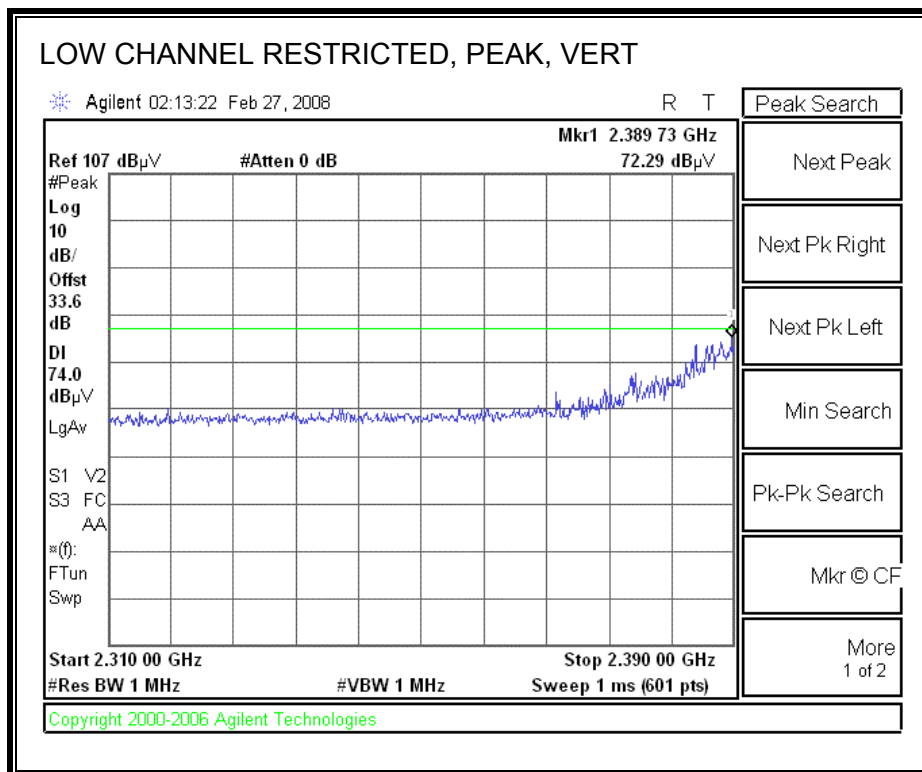
### 8.2.3. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND

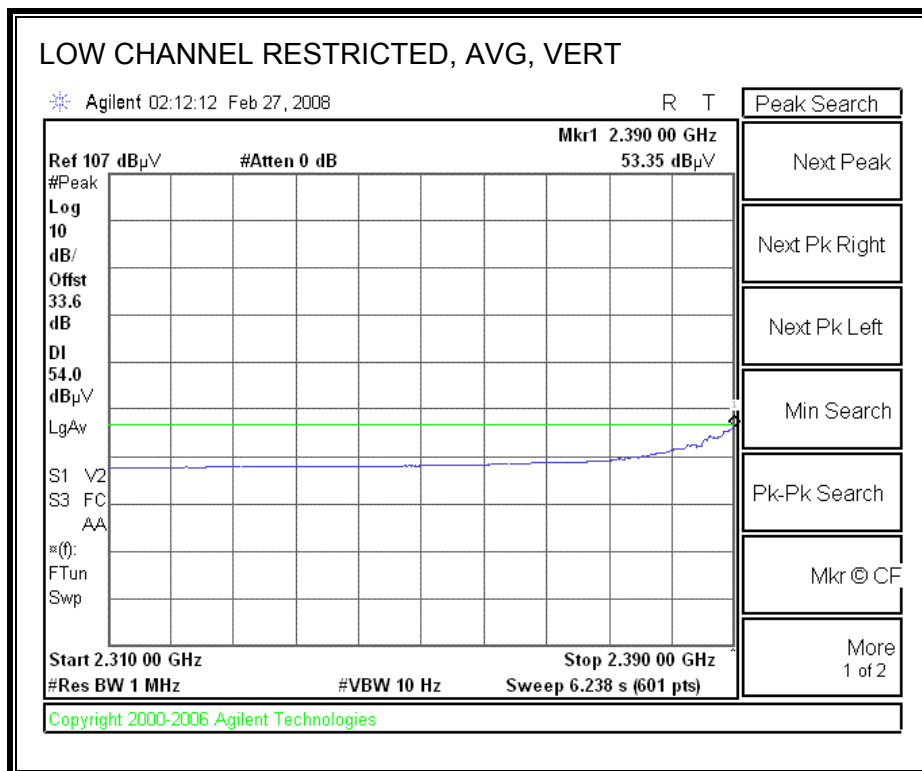
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



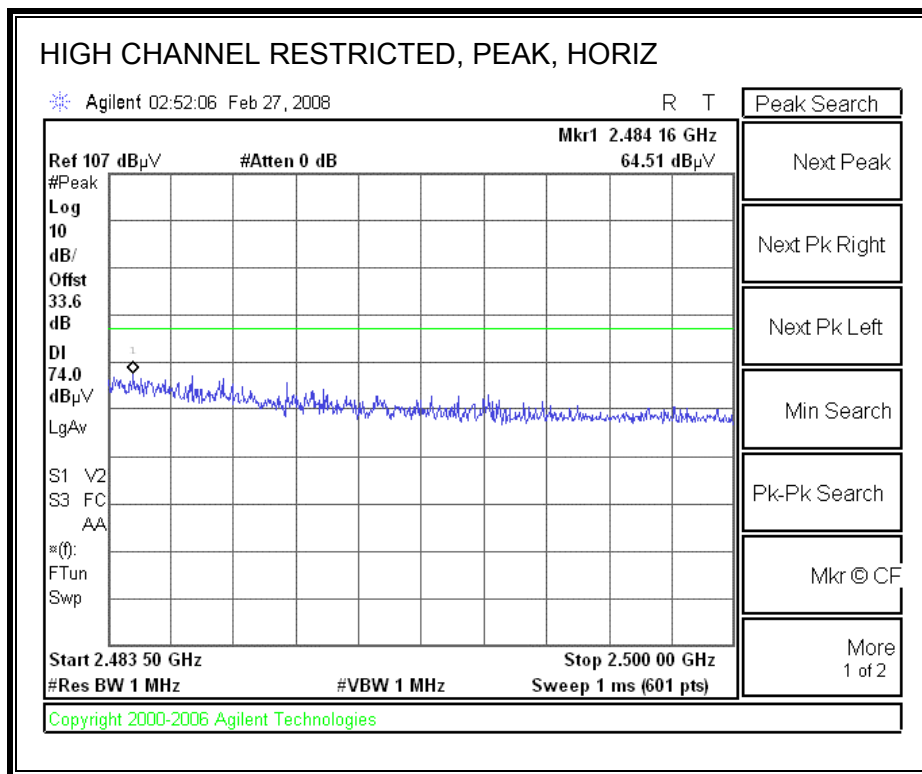


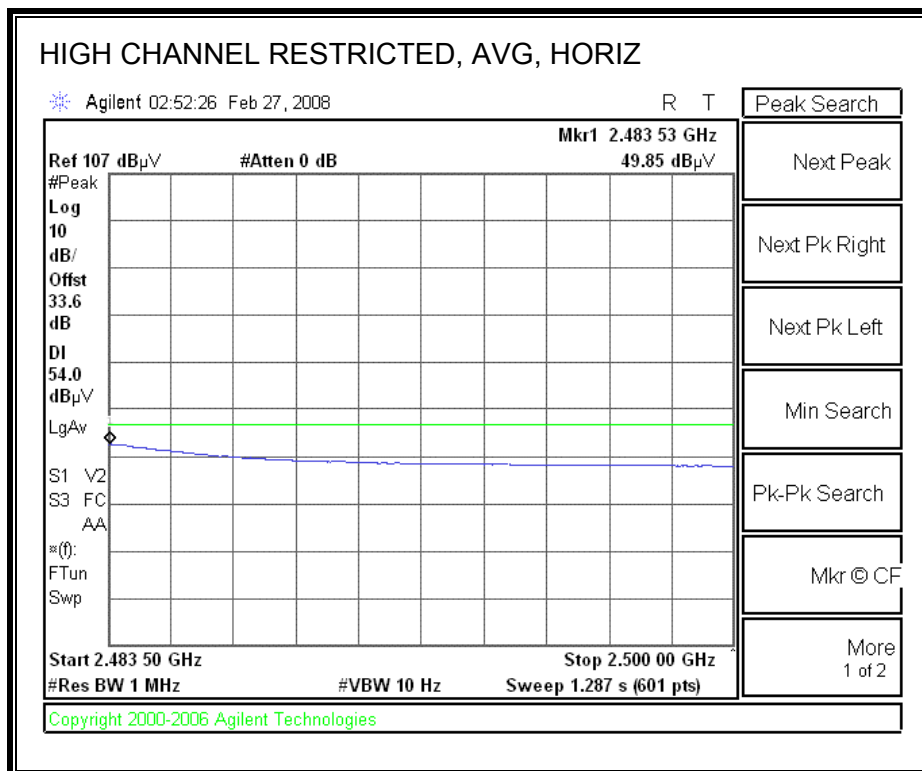
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



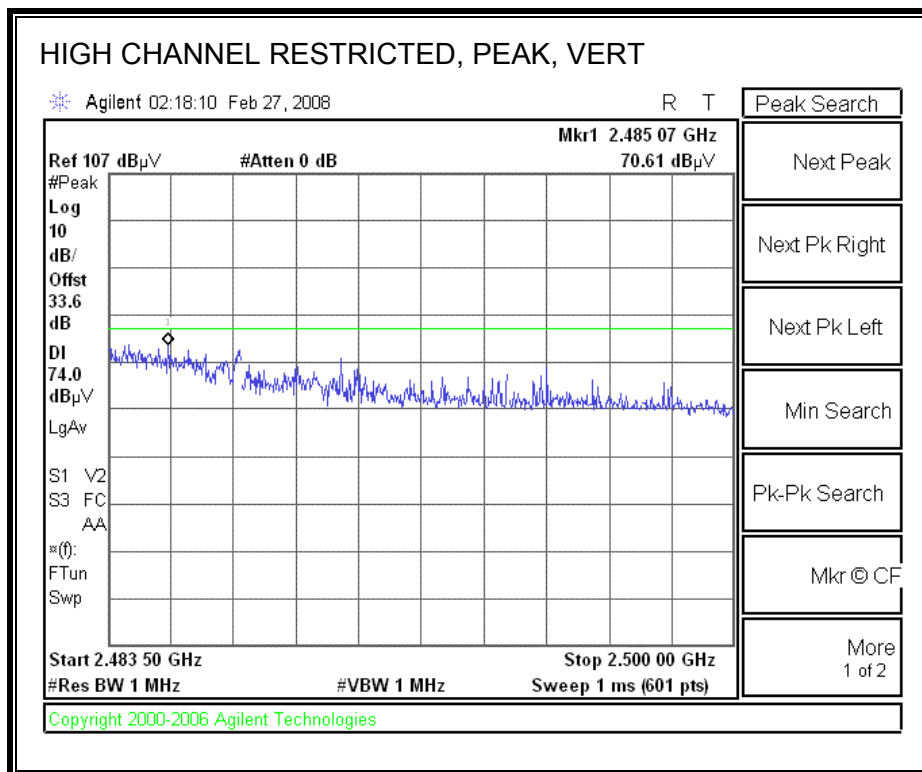


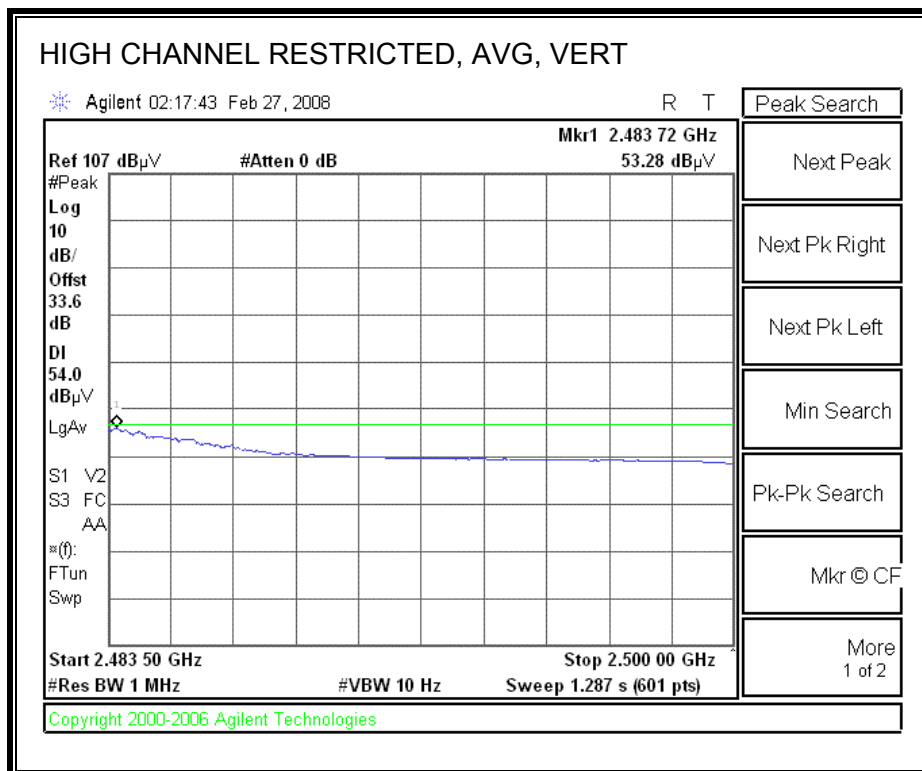
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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



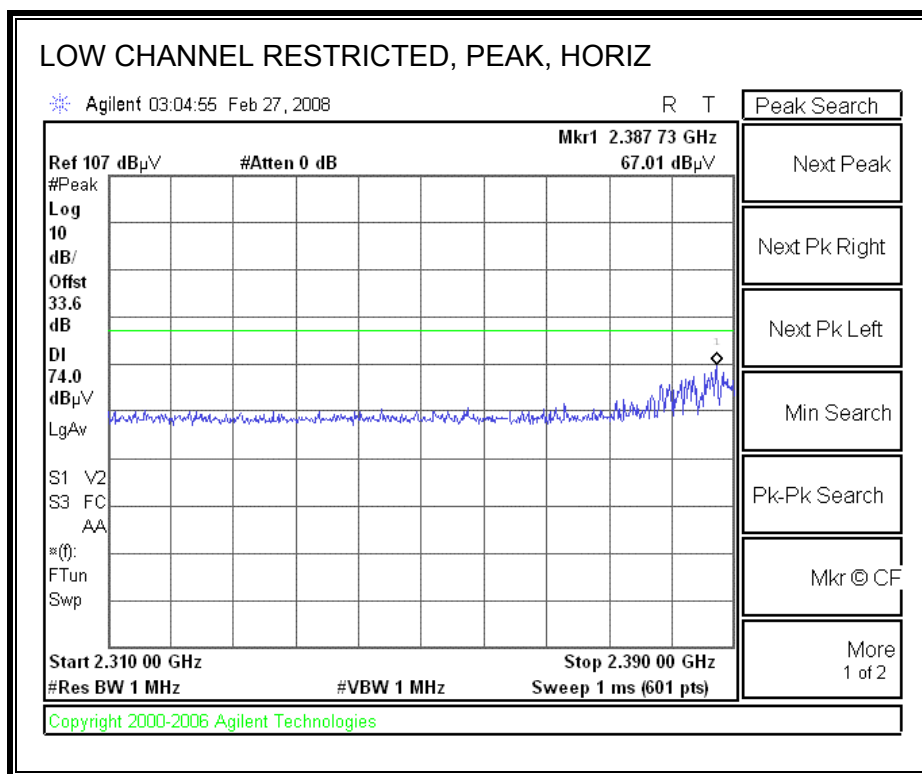


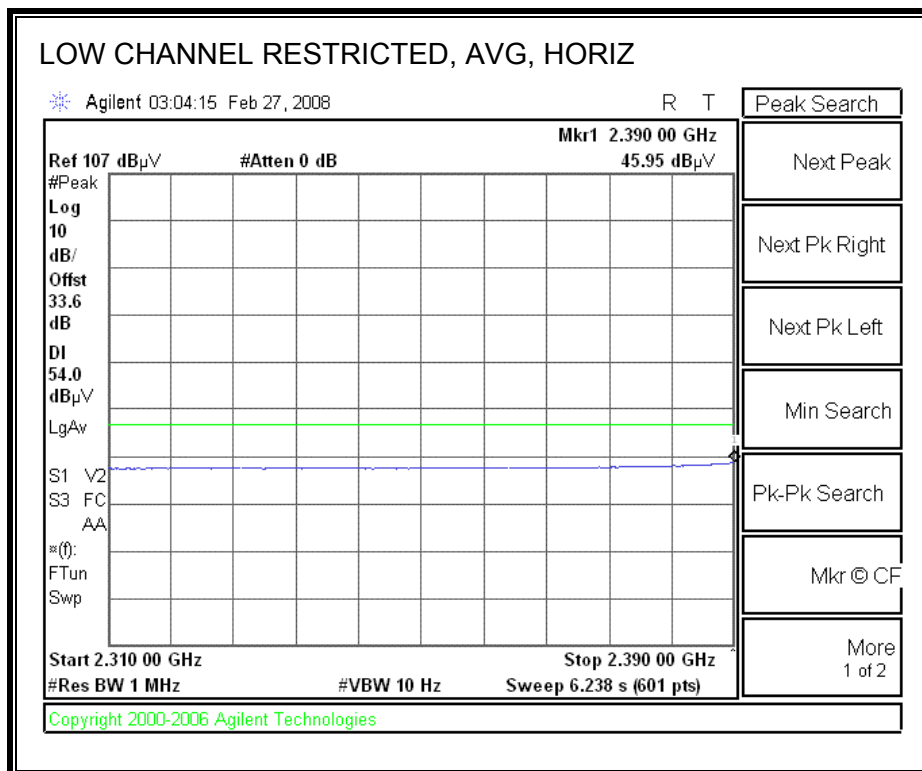
## HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                                                                                                                                       |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------|------------------------|-----|--------------|--------------------------------|---------------|--------|---------------------------------------------------------------------------------|--------|---------|------------------------------|---------|-------|
| Compliance Certification Services, Fremont 5m Chamber                                                                                                                            |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| Company: Atheros<br>Project #: 08U11571<br>Date: 2/27/2008<br>Test Engineer: Chin Pang<br>Configuration: EUT/Antenna/Laptop<br>Mode: HT20, TX<br>S/N: HB92-031-S-00805<br>FEM #1 |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| Test Equipment:                                                                                                                                                                  |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| Horn 1-18GHz                                                                                                                                                                     |                       | Pre-amplifier 1-26GHz |          | Pre-amplifier 26-40GHz |     | Horn > 18GHz |                                | Limit         |        |                                                                                 |        |         |                              |         |       |
| T73; S/N: 6717 @3m                                                                                                                                                               |                       | T34 HP 8449B          |          |                        |     |              |                                | FCC 15.209    |        |                                                                                 |        |         |                              |         |       |
| Hi Frequency Cables                                                                                                                                                              |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| 2 foot cable                                                                                                                                                                     |                       | 3 foot cable          |          | 12 foot cable          |     | HPF          |                                | Reject Filter |        | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz; VBW=10Hz |        |         |                              |         |       |
|                                                                                                                                                                                  |                       |                       |          | A-5m Chamber           |     |              |                                | R_001         |        |                                                                                 |        |         |                              |         |       |
| f                                                                                                                                                                                | Dist                  | Read Pk               | Read Avg | AF                     | CL  | Amp          | D Corr                         | Fldr          | Peak   | Avg                                                                             | Pk Lim | Avg Lim | Pk Mar                       | Avg Mar | Notes |
| GHz                                                                                                                                                                              | (m)                   | dBuV                  | dBuV     | dB/m                   | dB  | dB           | dB                             | dB            | dBuV/m | dBuV/m                                                                          | dBuV/m | dBuV/m  | dB                           | dB      | (V/H) |
| <b>Low Ch (2412MHz)</b>                                                                                                                                                          |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| 3.216                                                                                                                                                                            | 3.0                   | 43.5                  | 31.6     | 30.5                   | 5.5 | -35.7        | 0.0                            | 0.0           | 43.8   | 31.9                                                                            | 74     | 54      | -30.2                        | -22.1   | V     |
| 4.824                                                                                                                                                                            | 3.0                   | 45.0                  | 32.0     | 33.3                   | 6.9 | -34.8        | 0.0                            | 0.0           | 50.4   | 37.4                                                                            | 74     | 54      | -23.6                        | -16.6   | V     |
| 7.326                                                                                                                                                                            | 3.0                   | 43.0                  | 30.0     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 52.3   | 39.3                                                                            | 74     | 54      | -21.7                        | -14.7   | V     |
| 3.216                                                                                                                                                                            | 3.0                   | 45.6                  | 39.4     | 30.5                   | 5.5 | -35.7        | 0.0                            | 0.0           | 45.9   | 39.7                                                                            | 74     | 54      | -28.1                        | -14.3   | H     |
| 4.824                                                                                                                                                                            | 3.0                   | 43.7                  | 30.7     | 33.3                   | 6.9 | -34.8        | 0.0                            | 0.0           | 49.1   | 36.1                                                                            | 74     | 54      | -24.9                        | -17.9   | H     |
| 7.326                                                                                                                                                                            | 3.0                   | 42.0                  | 29.3     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 51.3   | 38.6                                                                            | 74     | 54      | -22.7                        | -15.4   | H     |
| <b>Mid Ch (2437MHz)</b>                                                                                                                                                          |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| 3.249                                                                                                                                                                            | 3.0                   | 42.8                  | 34.0     | 30.6                   | 5.5 | -35.7        | 0.0                            | 0.0           | 43.3   | 34.5                                                                            | 74     | 54      | -30.7                        | -19.5   | V     |
| 4.874                                                                                                                                                                            | 3.0                   | 47.2                  | 33.0     | 33.4                   | 6.9 | -34.8        | 0.0                            | 0.0           | 52.7   | 38.5                                                                            | 74     | 54      | -21.3                        | -15.5   | V     |
| 7.311                                                                                                                                                                            | 3.0                   | 44.0                  | 31.6     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 53.3   | 40.9                                                                            | 74     | 54      | -20.7                        | -13.1   | V     |
| 3.249                                                                                                                                                                            | 3.0                   | 43.0                  | 35.7     | 30.6                   | 5.5 | -35.7        | 0.0                            | 0.0           | 43.5   | 36.2                                                                            | 74     | 54      | -30.5                        | -17.8   | H     |
| 4.874                                                                                                                                                                            | 3.0                   | 45.0                  | 32.6     | 33.4                   | 6.9 | -34.8        | 0.0                            | 0.0           | 50.5   | 38.1                                                                            | 74     | 54      | -23.5                        | -15.9   | H     |
| 7.311                                                                                                                                                                            | 3.0                   | 43.5                  | 31.3     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 52.8   | 40.6                                                                            | 74     | 54      | -21.2                        | -13.4   | H     |
| <b>High Ch (2462MHz)</b>                                                                                                                                                         |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| 3.283                                                                                                                                                                            | 3.0                   | 42.0                  | 31.6     | 30.7                   | 5.6 | -35.6        | 0.0                            | 0.0           | 42.6   | 32.2                                                                            | 74     | 54      | -31.4                        | -21.8   | V     |
| 4.924                                                                                                                                                                            | 3.0                   | 46.3                  | 33.5     | 33.4                   | 7.0 | -34.8        | 0.0                            | 0.0           | 51.9   | 39.1                                                                            | 74     | 54      | -22.1                        | -14.9   | V     |
| 7.386                                                                                                                                                                            | 3.0                   | 45.0                  | 31.4     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 54.4   | 40.8                                                                            | 74     | 54      | -19.6                        | -13.2   | V     |
| 3.283                                                                                                                                                                            | 3.0                   | 42.5                  | 32.0     | 30.7                   | 5.6 | -35.6        | 0.0                            | 0.0           | 43.1   | 32.6                                                                            | 74     | 54      | -30.9                        | -21.4   | H     |
| 4.924                                                                                                                                                                            | 3.0                   | 44.2                  | 32.3     | 33.4                   | 7.0 | -34.8        | 0.0                            | 0.0           | 49.8   | 37.9                                                                            | 74     | 54      | -24.2                        | -16.1   | H     |
| 7.386                                                                                                                                                                            | 3.0                   | 43.8                  | 31.7     | 35.0                   | 8.4 | -34.1        | 0.0                            | 0.0           | 53.2   | 41.1                                                                            | 74     | 54      | -20.8                        | -12.9   | H     |
| Rev. 4.12.7                                                                                                                                                                      |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| Note: No other emissions were detected above the system noise floor.                                                                                                             |                       |                       |          |                        |     |              |                                |               |        |                                                                                 |        |         |                              |         |       |
| f                                                                                                                                                                                | Measurement Frequency |                       |          |                        |     | Amp          | Preamp Gain                    |               |        |                                                                                 |        | Avg Lim | Average Field Strength Limit |         |       |
| Dist                                                                                                                                                                             | Distance to Antenna   |                       |          |                        |     | D Corr       | Distance Correct to 3 meters   |               |        |                                                                                 |        | Pk Lim  | Peak Field Strength Limit    |         |       |
| Read                                                                                                                                                                             | Analyzer Reading      |                       |          |                        |     | Avg          | Average Field Strength @ 3 m   |               |        |                                                                                 |        | Avg Mar | Margin vs. Average Limit     |         |       |
| AF                                                                                                                                                                               | Antenna Factor        |                       |          |                        |     | Peak         | Calculated Peak Field Strength |               |        |                                                                                 |        | Pk Mar  | Margin vs. Peak Limit        |         |       |
| CL                                                                                                                                                                               | Cable Loss            |                       |          |                        |     | HPF          | High Pass Filter               |               |        |                                                                                 |        |         |                              |         |       |

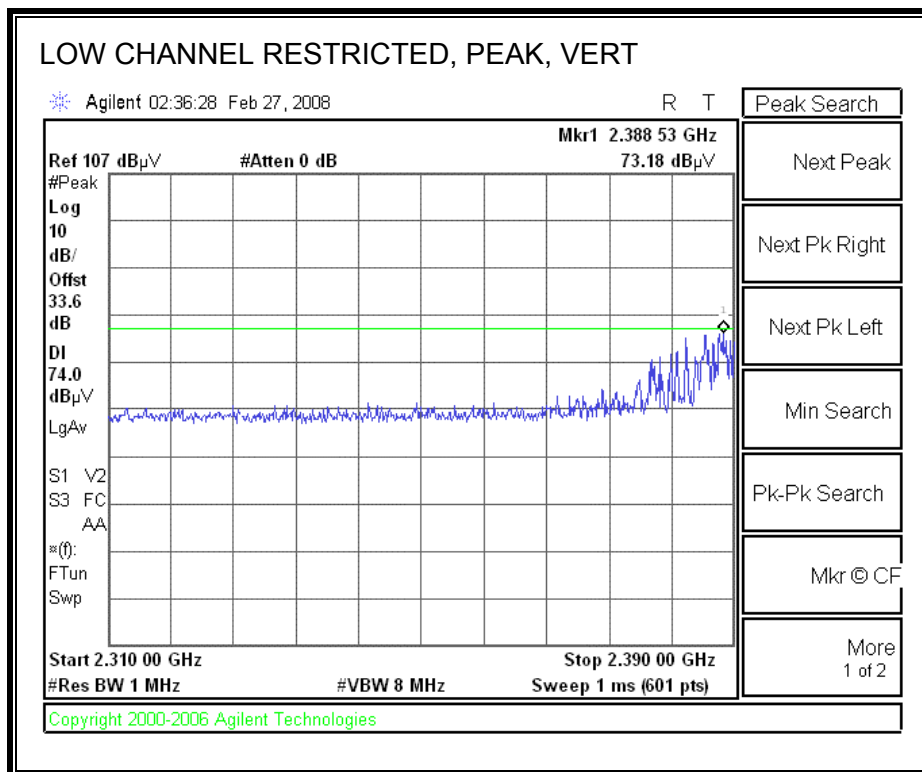
## 8.2.4. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 2.4 GHz BAND

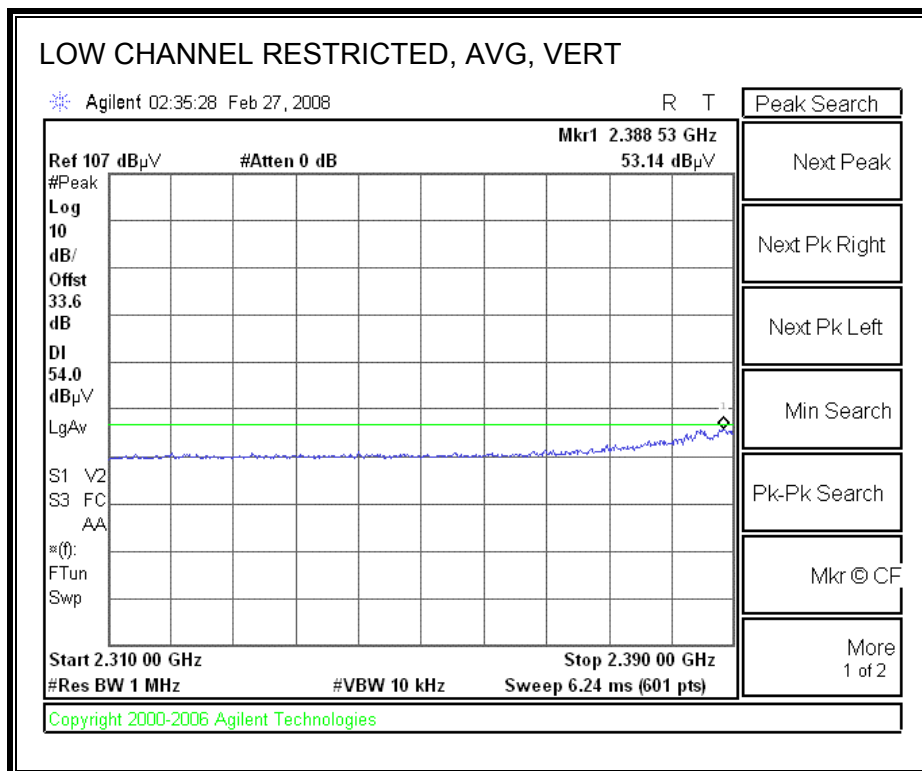
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



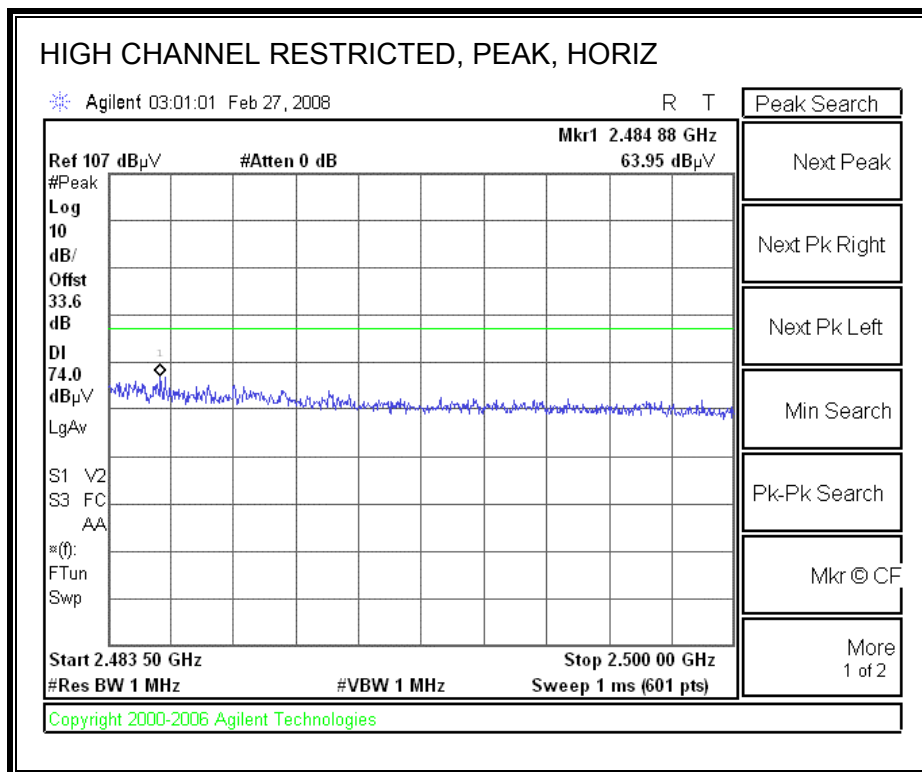


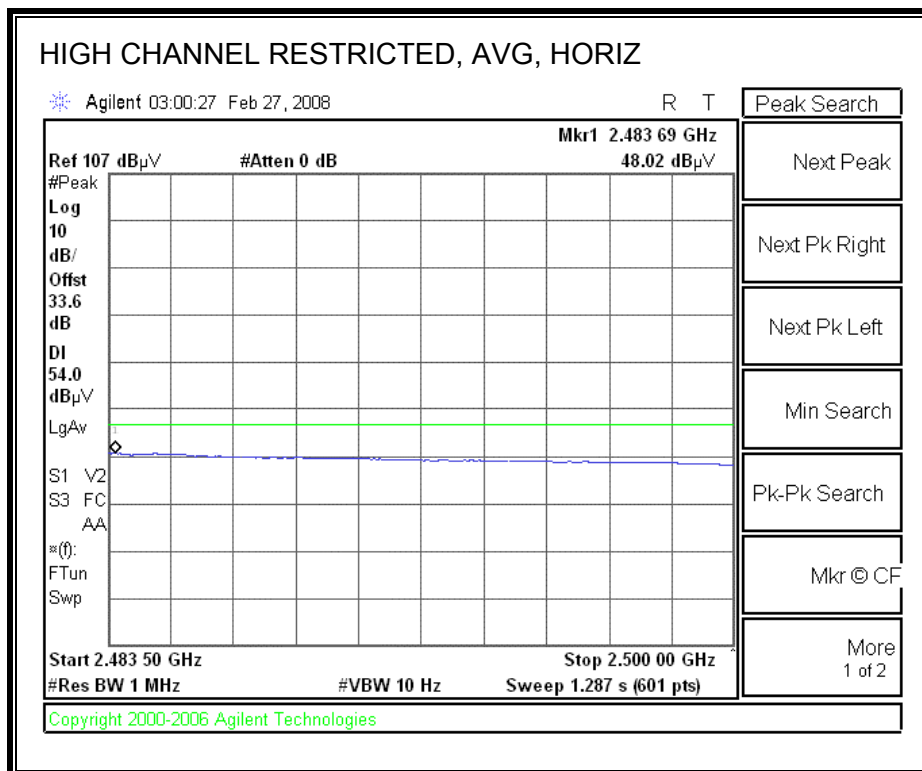
**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**



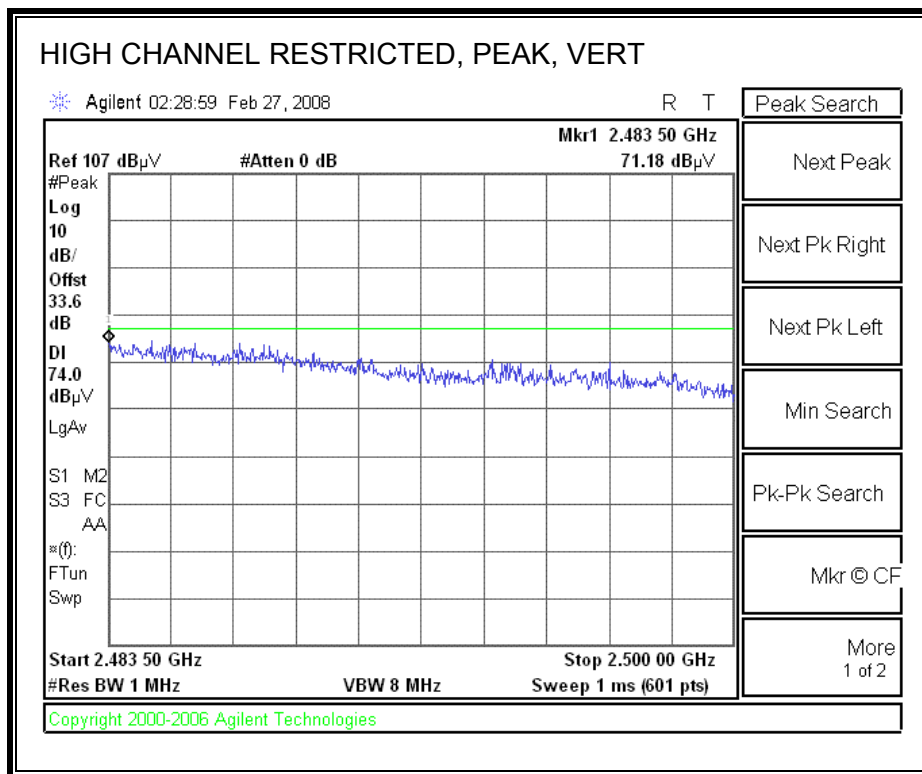


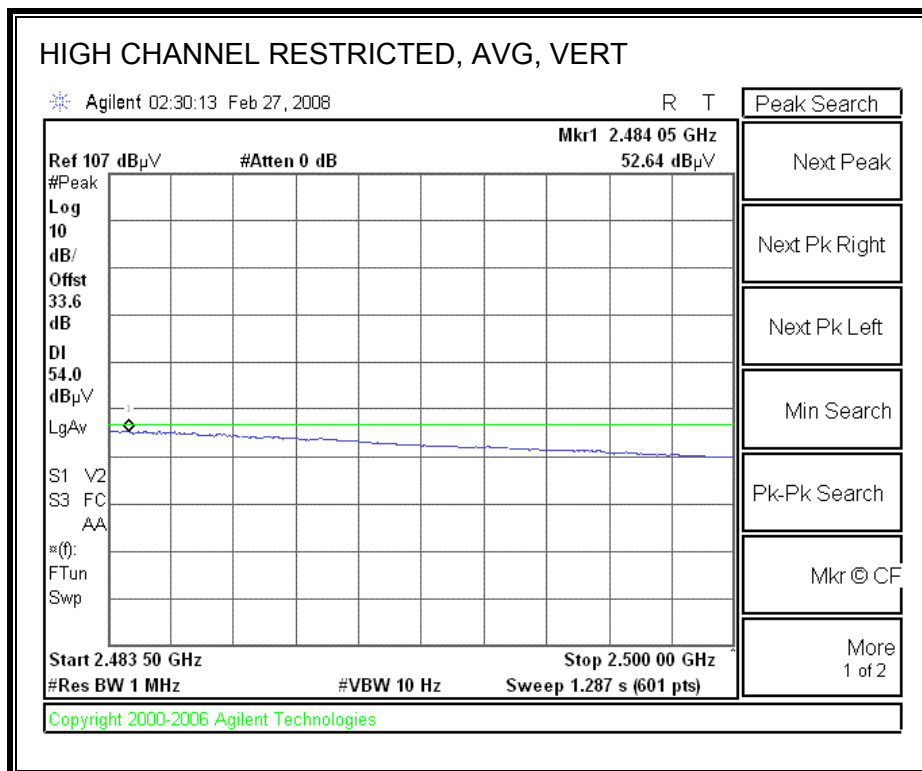
**RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)**





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





# **HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**

Compliance Certification Services, Fremont 5m Chamber

Company: Atheros  
Project #: 08U11571  
Date: 2/27/2008  
Test Engineer: Chin Pang  
Configuration: EUT/Antenna/Laptop  
Mode: HT40, TX  
S/N: HB92-031-S-S0805  
FEM #1

**Test Equipment:**

|                    |                       |                        |              |            |
|--------------------|-----------------------|------------------------|--------------|------------|
| Horn 1-18GHz       | Pre-amplifier 1-26GHz | Pre-amplifier 26-40GHz | Horn > 18GHz | Limit      |
| T73; S/N: 6717 @3m | T34 HP 8449B          |                        |              | FCC 15.209 |

Hi Frequency Cables

|              |              |               |     |               |                                                                                               |
|--------------|--------------|---------------|-----|---------------|-----------------------------------------------------------------------------------------------|
| 2 foot cable | 3 foot cable | 12 foot cable | HPF | Reject Filter | <b>Peak Measurements</b><br>RBW=VBW=1MHz<br><b>Average Measurements</b><br>RBW=1MHz; VBW=10Hz |
|              |              | A-5m Chamber  |     | R_001         |                                                                                               |

| f<br>GHz                 | Dist<br>(m) | Read Pk<br>dBuV | Read Avg.<br>dBuV | AF<br>dB/m | CL<br>dB | Amp<br>dB | D Corr<br>dB | Fldr<br>dB | Peak<br>dBuV/m | Avg<br>dBuV/m | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
|--------------------------|-------------|-----------------|-------------------|------------|----------|-----------|--------------|------------|----------------|---------------|------------------|-------------------|--------------|---------------|----------------|
| <b>Low Ch (2422MHz)</b>  |             |                 |                   |            |          |           |              |            |                |               |                  |                   |              |               |                |
| 3.229                    | 3.0         | 43.5            | 31.6              | 30.6       | 5.5      | -35.7     | 0.0          | 0.0        | 43.9           | 32.0          | 74               | 54                | -30.1        | -22.0         | V              |
| 4.844                    | 3.0         | 45.0            | 31.8              | 33.3       | 6.9      | -34.8     | 0.0          | 0.0        | 50.4           | 37.2          | 74               | 54                | -23.6        | -16.8         | V              |
| 7.266                    | 3.0         | 43.0            | 29.1              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 52.2           | 38.3          | 74               | 54                | -21.8        | -15.7         | V              |
| 3.229                    | 3.0         | 44.0            | 32.0              | 30.6       | 5.5      | -35.7     | 0.0          | 0.0        | 44.4           | 32.4          | 74               | 54                | -29.6        | -21.6         | H              |
| 4.844                    | 3.0         | 43.6            | 30.6              | 33.3       | 6.9      | -34.8     | 0.0          | 0.0        | 49.0           | 36.0          | 74               | 54                | -25.0        | -18.0         | H              |
| 7.266                    | 3.0         | 42.3            | 29.0              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 51.5           | 38.2          | 74               | 54                | -22.5        | -15.8         | H              |
| <b>Mid Ch (2437MHz)</b>  |             |                 |                   |            |          |           |              |            |                |               |                  |                   |              |               |                |
| 3.249                    | 3.0         | 42.5            | 32.0              | 30.6       | 5.5      | -35.7     | 0.0          | 0.0        | 43.0           | 32.5          | 74               | 54                | -31.0        | -21.5         | V              |
| 4.874                    | 3.0         | 46.8            | 33.0              | 33.4       | 6.9      | -34.8     | 0.0          | 0.0        | 52.3           | 38.5          | 74               | 54                | -21.7        | -15.5         | V              |
| 7.311                    | 3.0         | 43.0            | 30.4              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 52.3           | 39.7          | 74               | 54                | -21.7        | -14.3         | V              |
| 3.249                    | 3.0         | 43.6            | 33.7              | 30.6       | 5.5      | -35.7     | 0.0          | 0.0        | 44.1           | 34.2          | 74               | 54                | -29.9        | -19.8         | H              |
| 4.874                    | 3.0         | 44.7            | 31.8              | 33.4       | 6.9      | -34.8     | 0.0          | 0.0        | 50.2           | 37.3          | 74               | 54                | -23.8        | -16.7         | H              |
| 7.311                    | 3.0         | 42.6            | 30.5              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 51.9           | 39.8          | 74               | 54                | -22.1        | -14.2         | H              |
| <b>High Ch (2452MHz)</b> |             |                 |                   |            |          |           |              |            |                |               |                  |                   |              |               |                |
| 3.269                    | 3.0         | 42.5            | 31.0              | 30.7       | 5.6      | -35.6     | 0.0          | 0.0        | 43.1           | 31.6          | 74               | 54                | -30.9        | -22.4         | V              |
| 4.904                    | 3.0         | 47.0            | 33.4              | 33.4       | 7.0      | -34.8     | 0.0          | 0.0        | 52.5           | 38.9          | 74               | 54                | -21.5        | -15.1         | V              |
| 7.356                    | 3.0         | 44.3            | 32.3              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 53.7           | 41.7          | 74               | 54                | -20.3        | -12.3         | V              |
| 3.269                    | 3.0         | 43.6            | 33.0              | 30.7       | 5.6      | -35.6     | 0.0          | 0.0        | 44.2           | 33.6          | 74               | 54                | -29.8        | -20.4         | H              |
| 4.904                    | 3.0         | 45.5            | 31.5              | 33.4       | 7.0      | -34.8     | 0.0          | 0.0        | 51.0           | 37.0          | 74               | 54                | -23.0        | -17.0         | H              |
| 7.356                    | 3.0         | 43.2            | 30.8              | 35.0       | 8.4      | -34.1     | 0.0          | 0.0        | 52.6           | 40.2          | 74               | 54                | -21.4        | -13.8         | H              |

Rev. 4.12.7

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

## 8.2.5. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                           |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
|----------------------------------------------------------------------|-----------------------|-----------------------|------------------|------------------------|--------------------------------|--------------------------------------|--------------|---------------|------------------------------|---------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber                |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Company: Atheros Communications                                      |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Project #: 08U11571                                                  |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Date: 2/28/2008                                                      |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Test Engineer: Chin Pang                                             |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Configuration: EUT/Antenna/Laptop                                    |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Mode: Tx a mode                                                      |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Test Equipment:                                                      |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Horn 1-18GHz                                                         |                       | Pre-amplifier 1-26GHz |                  | Pre-amplifier 26-40GHz |                                | Horn > 18GHz                         |              | Limit         |                              |                                                                                 |                  |                   |              |               |                |
| T73; S/N: 6717 @3m                                                   |                       | T34 HP 8449B          |                  | T88 Miteq 26-40GHz     |                                | T39-T88 ARA 18-40GHz & Mixer > 40GHz |              | FCC 15.205    |                              |                                                                                 |                  |                   |              |               |                |
| Hi Frequency Cables                                                  |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| 2 foot cable                                                         |                       | 3 foot cable          |                  | 12 foot cable          |                                | HPF                                  |              | Reject Filter |                              | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz; VBW=10Hz |                  |                   |              |               |                |
|                                                                      |                       |                       |                  | A-5m Chamber           |                                | HPF_7.6GHz                           |              |               |                              |                                                                                 |                  |                   |              |               |                |
| f<br>GHz                                                             | Dist<br>(m)           | Read Pk<br>dBuV       | Read Avg<br>dBuV | AF<br>dB/m             | CL<br>dB                       | Amp<br>dB                            | D Corr<br>dB | Filt<br>dB    | Peak<br>dBuV/m               | Avg<br>dBuV/m                                                                   | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
| 5745MHz                                                              |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| 11.490                                                               | 1.0                   | 55.7                  | 43.5             | 37.5                   | 11.6                           | -32.5                                | -9.5         | 0.7           | 63.4                         | 51.2                                                                            | 74               | 54                | -10.6        | -2.8          | V              |
| 11.490                                                               | 1.0                   | 48.6                  | 38.0             | 37.5                   | 11.6                           | -32.5                                | -9.5         | 0.7           | 56.3                         | 45.7                                                                            | 74               | 54                | -17.7        | -8.3          | H              |
| 5785MHz                                                              |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| 11.570                                                               | 1.0                   | 56.0                  | 44.2             | 37.5                   | 11.7                           | -32.5                                | -9.5         | 0.7           | 63.8                         | 52.0                                                                            | 74               | 54                | -10.2        | -2.0          | V              |
| 11.570                                                               | 1.0                   | 50.0                  | 38.6             | 37.5                   | 11.7                           | -32.5                                | -9.5         | 0.7           | 57.8                         | 46.4                                                                            | 74               | 54                | -16.2        | -7.6          | H              |
| 5825MHz                                                              |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| 11.650                                                               | 1.0                   | 54.0                  | 42.0             | 37.5                   | 11.8                           | -32.5                                | -9.5         | 0.7           | 61.9                         | 49.9                                                                            | 74               | 54                | -12.1        | -4.1          | V              |
| 11.650                                                               | 1.0                   | 47.4                  | 35.0             | 37.5                   | 11.8                           | -32.5                                | -9.5         | 0.7           | 55.3                         | 42.9                                                                            | 74               | 54                | -18.7        | -11.1         | H              |
| Rev. 4.12.7                                                          |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| Note: No other emissions were detected above the system noise floor. |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |
| f                                                                    | Measurement Frequency |                       |                  | Amp                    | Preamp Gain                    |                                      |              | Avg Lim       | Average Field Strength Limit |                                                                                 |                  |                   |              |               |                |
| Dist                                                                 | Distance to Antenna   |                       |                  | D Corr                 | Distance Correct to 3 meters   |                                      |              | Pk Lim        | Peak Field Strength Limit    |                                                                                 |                  |                   |              |               |                |
| Read                                                                 | Analyzer Reading      |                       |                  | Avg                    | Average Field Strength @ 3 m   |                                      |              | Avg Mar       | Margin vs. Average Limit     |                                                                                 |                  |                   |              |               |                |
| AF                                                                   | Antenna Factor        |                       |                  | Peak                   | Calculated Peak Field Strength |                                      |              | Pk Mar        | Margin vs. Peak Limit        |                                                                                 |                  |                   |              |               |                |
| CL                                                                   | Cable Loss            |                       |                  | HPF                    | High Pass Filter               |                                      |              |               |                              |                                                                                 |                  |                   |              |               |                |

## 8.2.6. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                                                                                                                       |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|------------------|------------------------|--------------------------------|--------------------------------------|--------------|---------------|------------------------------|----------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber                                                                                                            |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| Company: Atheros Communications<br>Project #: 08U11571<br>Date: 2/28/2008<br>Test Engineer: Chin Pang<br>Configuration: EUT/Antenna/Laptop<br>Mode: Tx HT20 mode |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| Test Equipment:                                                                                                                                                  |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| Horn 1-18GHz                                                                                                                                                     |                       | Pre-amplifier 1-26GHz |                  | Pre-amplifier 26-40GHz |                                | Horn > 18GHz                         |              | Limit         |                              |                                                                                  |                  |                   |              |               |                |
| T73; S/N: 6717 @3m                                                                                                                                               |                       | T34 HP 8449B          |                  | T88 Miteq 26-40GHz     |                                | T39-T88 ARA 18-40GHz & Mixer > 40GHz |              | FCC 15.205    |                              |                                                                                  |                  |                   |              |               |                |
| Hi Frequency Cables                                                                                                                                              |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| 2 foot cable                                                                                                                                                     |                       | 3 foot cable          |                  | 12 foot cable          |                                | HPF                                  |              | Reject Filter |                              | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |                  |                   |              |               |                |
|                                                                                                                                                                  |                       |                       |                  | A-5m Chamber           |                                | HPF_7.6GHz                           |              |               |                              |                                                                                  |                  |                   |              |               |                |
| f<br>GHz                                                                                                                                                         | Dist<br>(m)           | Read Pk<br>dBuV       | Read Avg<br>dBuV | AF<br>dB/m             | CL<br>dB                       | Amp<br>dB                            | D Corr<br>dB | Filt<br>dB    | Peak<br>dBuV/m               | Avg<br>dBuV/m                                                                    | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
| <b>5745MHz</b>                                                                                                                                                   |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| 11.490                                                                                                                                                           | 1.0                   | 55.4                  | 43.0             | 37.5                   | 11.6                           | -32.5                                | -9.5         | 0.7           | 63.1                         | 50.7                                                                             | 74               | 54                | -10.9        | -3.3          | V              |
| 11.490                                                                                                                                                           | 1.0                   | 51.2                  | 37.6             | 37.5                   | 11.6                           | -32.5                                | -9.5         | 0.7           | 58.9                         | 45.3                                                                             | 74               | 54                | -15.1        | -8.7          | H              |
| <b>5785MHz</b>                                                                                                                                                   |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| 11.570                                                                                                                                                           | 1.0                   | 56.0                  | 43.5             | 37.5                   | 11.7                           | -32.5                                | -9.5         | 0.7           | 63.8                         | 51.3                                                                             | 74               | 54                | -10.2        | -2.7          | V              |
| 11.570                                                                                                                                                           | 1.0                   | 53.2                  | 38.2             | 37.5                   | 11.7                           | -32.5                                | -9.5         | 0.7           | 61.0                         | 46.0                                                                             | 74               | 54                | -13.0        | -8.0          | H              |
| <b>5825MHz</b>                                                                                                                                                   |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| 11.650                                                                                                                                                           | 1.0                   | 54.8                  | 41.0             | 37.5                   | 11.8                           | -32.5                                | -9.5         | 0.7           | 62.7                         | 48.9                                                                             | 74               | 54                | -11.3        | -5.1          | V              |
| 11.650                                                                                                                                                           | 1.0                   | 51.6                  | 36.0             | 37.5                   | 11.8                           | -32.5                                | -9.5         | 0.7           | 59.5                         | 43.9                                                                             | 74               | 54                | -14.5        | -10.1         | H              |
| Rev. 4.12.7                                                                                                                                                      |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| Note: No other emissions were detected above the system noise floor.                                                                                             |                       |                       |                  |                        |                                |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |
| f                                                                                                                                                                | Measurement Frequency |                       |                  | Amp                    | Preamp Gain                    |                                      |              | Avg Lim       | Average Field Strength Limit |                                                                                  |                  |                   |              |               |                |
| Dist                                                                                                                                                             | Distance to Antenna   |                       |                  | D Corr                 | Distance Correct to 3 meters   |                                      |              | Pk Lim        | Peak Field Strength Limit    |                                                                                  |                  |                   |              |               |                |
| Read                                                                                                                                                             | Analyzer Reading      |                       |                  | Avg                    | Average Field Strength @ 3 m   |                                      |              | Avg Mar       | Margin vs. Average Limit     |                                                                                  |                  |                   |              |               |                |
| AF                                                                                                                                                               | Antenna Factor        |                       |                  | Peak                   | Calculated Peak Field Strength |                                      |              | Pk Mar        | Margin vs. Peak Limit        |                                                                                  |                  |                   |              |               |                |
| CL                                                                                                                                                               | Cable Loss            |                       |                  | HPF                    | High Pass Filter               |                                      |              |               |                              |                                                                                  |                  |                   |              |               |                |

## 8.2.7. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.8 GHz BAND

### HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                           |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
|----------------------------------------------------------------------|-----------------------|-----------------------|------------------|--------------------------------|----------|--------------------------------------|------------------------------|---------------|----------------|----------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber                |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Company: Atheros Communications                                      |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Project #: 08U11571                                                  |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Date: 2/28/2008                                                      |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Test Engineer: Chin Pang                                             |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Configuration: EUT/Antenna/Laptop.                                   |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Mode: Tx HT40 mode                                                   |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Test Equipment:                                                      |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Horn 1-18GHz                                                         |                       | Pre-amplifier 1-26GHz |                  | Pre-amplifier 26-40GHz         |          | Horn > 18GHz                         |                              | Limit         |                |                                                                                  |                  |                   |              |               |                |
| T73; S/N: 6717 @3m                                                   |                       | T34 HP 8449B          |                  | T88 Miteq 26-40GHz             |          | T39-T88 ARA 18-40GHz & Mixer > 40GHz |                              | FCC 15.205    |                |                                                                                  |                  |                   |              |               |                |
| Hi Frequency Cables                                                  |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 2 foot cable                                                         |                       | 3 foot cable          |                  | 12 foot cable                  |          | HPF                                  |                              | Reject Filter |                | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |                  |                   |              |               |                |
|                                                                      |                       |                       |                  | A-5m Chamber                   |          | HPF_7.6GHz                           |                              |               |                |                                                                                  |                  |                   |              |               |                |
| f<br>GHz                                                             | Dist<br>(m)           | Read Pk<br>dBuV       | Read Avg<br>dBuV | AF<br>dB/m                     | CL<br>dB | Amp<br>dB                            | D Corr<br>dB                 | Filt<br>dB    | Peak<br>dBuV/m | Avg<br>dBuV/m                                                                    | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
| Low channel (5755MHz)                                                |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 11.510                                                               | 1.0                   | 52.6                  | 42.5             | 37.5                           | 11.6     | -32.5                                | -9.5                         | 0.7           | 60.3           | 50.2                                                                             | 74               | 54                | -13.7        | -3.8          | V              |
| 11.510                                                               | 1.0                   | 46.5                  | 33.5             | 37.5                           | 11.6     | -32.5                                | -9.5                         | 0.7           | 54.2           | 41.2                                                                             | 74               | 54                | -19.8        | -12.8         | H              |
| High Channel (5795MHz)                                               |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 11.590                                                               | 1.0                   | 51.5                  | 42.0             | 37.5                           | 11.7     | -32.5                                | -9.5                         | 0.7           | 59.4           | 49.9                                                                             | 74               | 54                | -14.6        | -4.1          | V              |
| 11.590                                                               | 1.0                   | 47.0                  | 35.0             | 37.5                           | 11.7     | -32.5                                | -9.5                         | 0.7           | 54.9           | 42.9                                                                             | 74               | 54                | -19.1        | -11.1         | H              |
| Rev. 4.12.7                                                          |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Note: No other emissions were detected above the system noise floor. |                       |                       |                  |                                |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |
| f                                                                    | Measurement Frequency |                       | Amp              | Preamp Gain                    |          | Avg Lim                              | Average Field Strength Limit |               |                |                                                                                  |                  |                   |              |               |                |
| Dist                                                                 | Distance to Antenna   |                       | D Corr           | Distance Correct to 3 meters   |          | Pk Lim                               | Peak Field Strength Limit    |               |                |                                                                                  |                  |                   |              |               |                |
| Read                                                                 | Analyzer Reading      |                       | Avg              | Average Field Strength @ 3 m   |          | Avg Mar                              | Margin vs. Average Limit     |               |                |                                                                                  |                  |                   |              |               |                |
| AF                                                                   | Antenna Factor        |                       | Peak             | Calculated Peak Field Strength |          | Pk Mar                               | Margin vs. Peak Limit        |               |                |                                                                                  |                  |                   |              |               |                |
| CL                                                                   | Cable Loss            |                       | HPF              | High Pass Filter               |          |                                      |                              |               |                |                                                                                  |                  |                   |              |               |                |

### 8.3. RECEIVER ABOVE 1 GHz

| High Frequency Measurement                                           |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
|----------------------------------------------------------------------|-----------------------|-----------------------|------------------|------------------------|--------------------------------|--------------|--------------|---------------|------------------------------|-----------------------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber                |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Company: Atheros Communications                                      |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Project #: 08U11571                                                  |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Date: 2/29/2008                                                      |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Test Engineer: Chin Pang                                             |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Configuration: EUT/Antenna/Laptop                                    |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Mode: 2.4GHz RX ( Worst Case )                                       |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| <b>Test Equipment:</b>                                               |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Horn 1-18GHz                                                         |                       | Pre-amplifier 1-26GHz |                  | Pre-amplifier 26-40GHz |                                | Horn > 18GHz |              | Limit         |                              |                                                                                               |                  |                   |              |               |                |
| T73; S/N: 6717 @3m                                                   |                       | T34 HP 8449B          |                  |                        |                                |              |              | FCC 15.209    |                              |                                                                                               |                  |                   |              |               |                |
| Hi Frequency Cables                                                  |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| 2 foot cable                                                         |                       | 3 foot cable          |                  | 12 foot cable          |                                | HPF          |              | Reject Filter |                              | <b>Peak Measurements</b><br>RBW=VBW=1MHz<br><b>Average Measurements</b><br>RBW=1MHz, VBW=10Hz |                  |                   |              |               |                |
|                                                                      |                       |                       |                  | A-5m Chamber           |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| f<br>GHz                                                             | Dist<br>(m)           | Read Pk<br>dBuV       | Read Avg<br>dBuV | AF<br>dB/m             | CL<br>dB                       | Amp<br>dB    | D Corr<br>dB | Ftr<br>dB     | Peak<br>dBuV/m               | Avg<br>dBuV/m                                                                                 | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |
| Mid Ch                                                               |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| 1.062                                                                | 3.0                   | 54.0                  | 34.2             | 25.9                   | 3.1                            | -38.2        | 0.0          | 0.0           | 44.8                         | 25.0                                                                                          | 74               | 54                | -29.2        | -29.0         | V              |
| 2.492                                                                | 3.0                   | 58.5                  | 36.0             | 29.5                   | 4.9                            | -36.3        | 0.0          | 0.0           | 56.7                         | 34.2                                                                                          | 74               | 54                | -17.3        | -19.8         | V              |
| 1.062                                                                | 3.0                   | 53.4                  | 33.5             | 25.9                   | 3.1                            | -38.2        | 0.0          | 0.0           | 44.2                         | 24.3                                                                                          | 74               | 54                | -29.8        | -29.7         | H              |
| 2.500                                                                | 3.0                   | 57.8                  | 34.1             | 29.5                   | 4.9                            | -36.3        | 0.0          | 0.0           | 56.0                         | 32.3                                                                                          | 74               | 54                | -18.0        | -21.7         | H              |
|                                                                      |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Rev. 4.12.7                                                          |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| Note: No other emissions were detected above the system noise floor. |                       |                       |                  |                        |                                |              |              |               |                              |                                                                                               |                  |                   |              |               |                |
| f                                                                    | Measurement Frequency |                       |                  | Amp                    | Preamp Gain                    |              |              | Avg Lim       | Average Field Strength Limit |                                                                                               |                  |                   |              |               |                |
| Dist                                                                 | Distance to Antenna   |                       |                  | D Corr                 | Distance Correct to 3 meters   |              |              | Pk Lim        | Peak Field Strength Limit    |                                                                                               |                  |                   |              |               |                |
| Read                                                                 | Analyzer Reading      |                       |                  | Avg                    | Average Field Strength @ 3 m   |              |              | Avg Mar       | Margin vs. Average Limit     |                                                                                               |                  |                   |              |               |                |
| AF                                                                   | Antenna Factor        |                       |                  | Peak                   | Calculated Peak Field Strength |              |              | Pk Mar        | Margin vs. Peak Limit        |                                                                                               |                  |                   |              |               |                |
| CL                                                                   | Cable Loss            |                       |                  | HPF                    | High Pass Filter               |              |              |               |                              |                                                                                               |                  |                   |              |               |                |

## 8.4. WORST-CASE BELOW 1 GHz

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

#### HORIZONTAL DATA

Condition: FCC CLASS-B HORIZONTAL  
Test Operator: Chin Pang  
Project # : 08U11571  
Company : Atheros Communications  
Config : EUT/laptop/antenna  
Mode : 2.4GHz Band, Tx (Worst Case)  
Target : FCC Class B

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 181.320 | 55.83         | -18.52 | 37.32  | 43.50         | -6.18         | Peak   |
| 2 | 357.860 | 48.00         | -14.43 | 33.57  | 46.00         | -12.43        | Peak   |
| 3 | 454.860 | 48.33         | -12.28 | 36.05  | 46.00         | -9.95         | Peak   |
| 4 | 551.860 | 44.50         | -10.68 | 33.82  | 46.00         | -12.18        | Peak   |
| 5 | 700.270 | 43.83         | -8.56  | 35.27  | 46.00         | -10.73        | Peak   |
| 6 | 799.210 | 43.33         | -7.05  | 36.28  | 46.00         | -9.72         | Peak   |

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL DATA

Condition: FCC CLASS-B VERTICAL  
Test Operator: Chin Pang  
Project # : 08U11571  
Company : Atheros Communications  
Config : EUT/laptop/antenna  
Mode : 2.4GHz Band, Tx (Worst Case)  
Target : FCC Class B

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 175.500 | 51.67         | -18.49 | 33.18  | 43.50         | -10.32        | Peak   |
| 2 | 258.920 | 49.67         | -17.48 | 32.19  | 46.00         | -13.81        | Peak   |
| 3 | 356.890 | 50.33         | -14.31 | 36.02  | 46.00         | -9.98         | Peak   |
| 4 | 452.920 | 49.83         | -12.32 | 37.51  | 46.00         | -8.49         | Peak   |
| 5 | 486.870 | 48.00         | -11.59 | 36.41  | 46.00         | -9.59         | Peak   |
| 6 | 698.330 | 40.33         | -8.54  | 31.79  | 46.00         | -14.21        | Peak   |

## 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

# **6 WORST EMISSIONS**

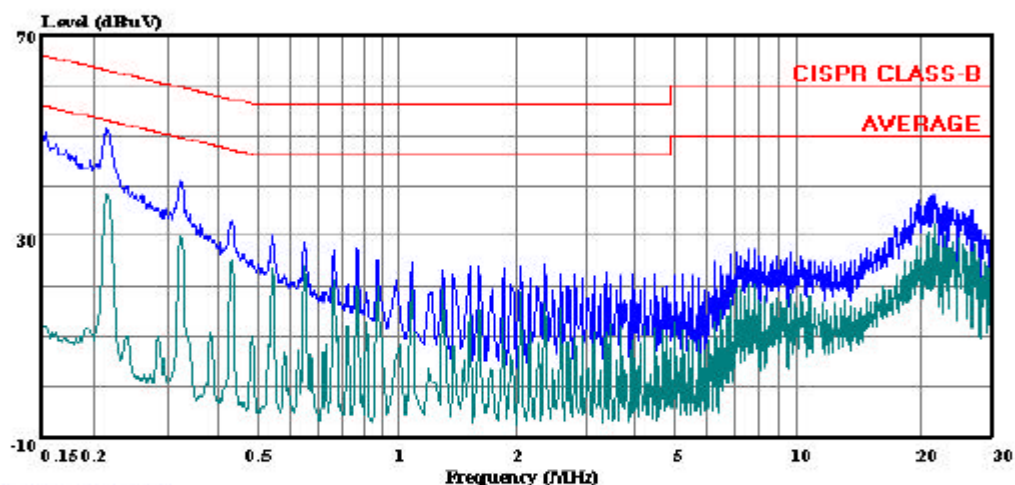
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |       |       |       |         |         |         |
|----------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                  | Reading   |           |           | Closs | Limit | EN B  | Margin  |         | Remark  |
| (MHz)                                  | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.22                                   | 51.17     | --        | 38.33     | 0.00  | 63.01 | 53.01 | -11.84  | -14.68  | L1      |
| 0.32                                   | 40.84     | --        | 29.74     | 0.00  | 59.63 | 49.63 | -18.79  | -19.89  | L1      |
| 21.71                                  | 38.27     | --        | 32.32     | 0.00  | 60.00 | 50.00 | -21.73  | -17.68  | L1      |
| 0.22                                   | 52.03     | --        | 38.67     | 0.00  | 63.01 | 53.01 | -10.98  | -14.34  | L2      |
| 0.32                                   | 40.62     | --        | 29.60     | 0.00  | 59.63 | 49.63 | -19.01  | -20.03  | L2      |
| 21.26                                  | 34.70     | --        | 27.01     | 0.00  | 60.00 | 50.00 | -25.30  | -22.99  | L2      |
| 6 Worst Data                           |           |           |           |       |       |       |         |         |         |

## LINE 1 RESULTS



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

Data#: 70 File#: 08U11571 LC.EMI Date: 02-29-2008 Time: 18:21:49



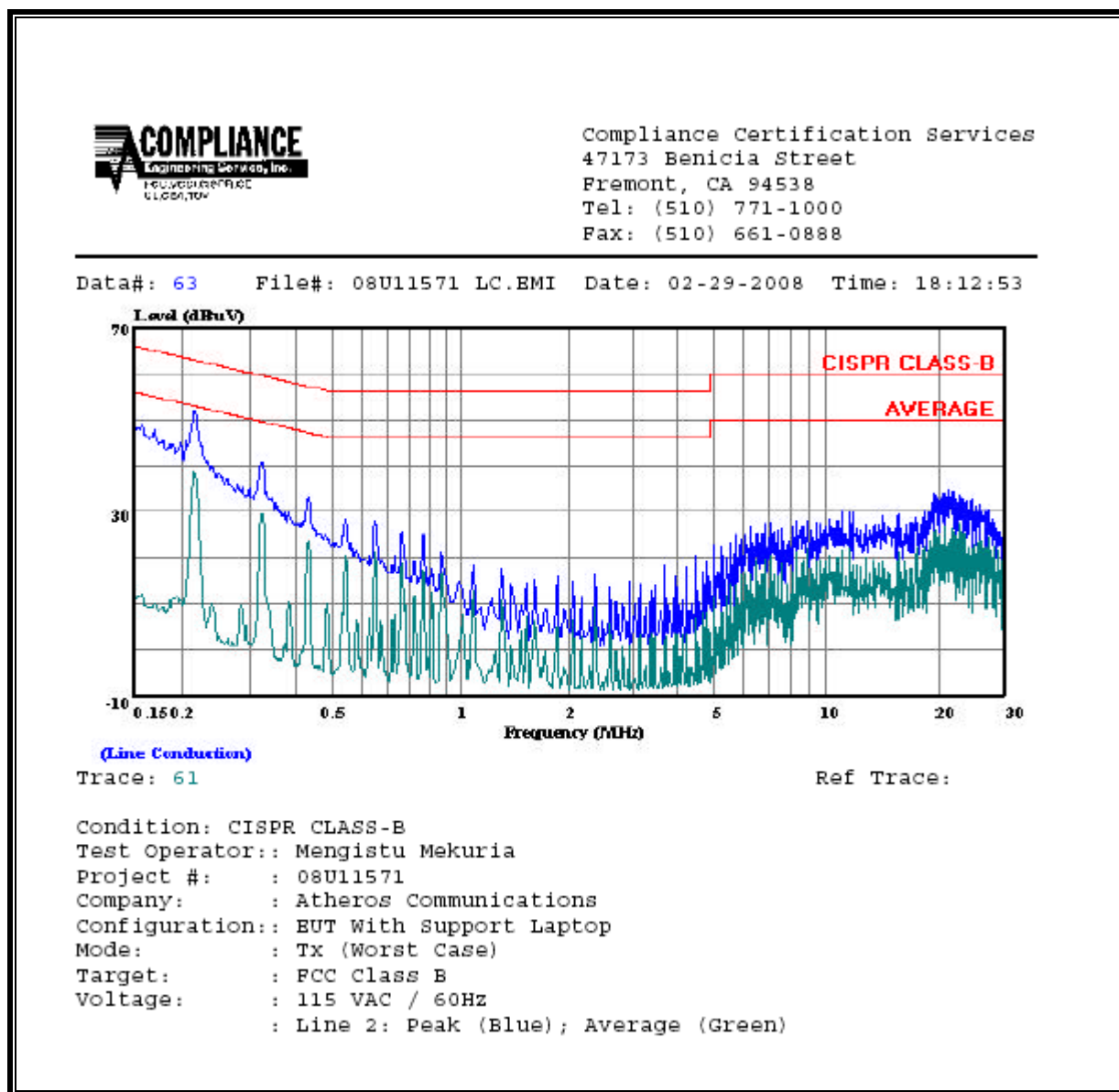
(Line Conduction)

Trace: 68

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator:: Mengistu Mekuria  
Project #: 08U11571  
Company: Atheros Communications  
Configuration: EUT With Support Laptop  
Mode: Tx (Worst Case)  
Target: FCC Class B  
Voltage: 115 VAC / 60Hz  
Line 1: Peak (Blue); Average (Green)

## LINE 2 RESULTS



## 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<br>(MHz)                                | Electric field<br>strength<br>(V/m) | Magnetic field<br>strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(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<br>(MHz) | Electric field<br>strength<br>(V/m) | Magnetic field<br>strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(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<br>Frequency<br>(MHz) | 2<br>Electric Field<br>Strength; rms<br>(V/m) | 3<br>Magnetic Field<br>Strength; rms<br>(A/m)   | 4<br>Power<br>Density<br>(W/m <sup>2</sup> ) | 5<br>Averaging<br>Time<br>(min)   |
|-------------------------|-----------------------------------------------|-------------------------------------------------|----------------------------------------------|-----------------------------------|
| 0.003–1                 | 280                                           | 2.19                                            |                                              | 6                                 |
| 1–10                    | 280/ <i>f</i>                                 | 2.19/ <i>f</i>                                  |                                              | 6                                 |
| 10–30                   | 28                                            | 2.19/ <i>f</i>                                  |                                              | 6                                 |
| 30–300                  | 28                                            | 0.073                                           | 2*                                           | 6                                 |
| 300–1 500               | 1.585 <i>f</i> <sup>0.5</sup>                 | 0.0042 <i>f</i> <sup>0.5</sup>                  | <i>f</i> /150                                | 6                                 |
| 1 500–15 000            | 61.4                                          | 0.163                                           | 10                                           | 6                                 |
| 15 000–150 000          | 61.4                                          | 0.163                                           | 10                                           | 616 000 / <i>f</i> <sup>1.2</sup> |
| 150 000–300 000         | 0.158 <i>f</i> <sup>0.5</sup>                 | 4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup> | 6.67 x 10 <sup>-5</sup> <i>f</i>             | 616 000 / <i>f</i> <sup>1.2</sup> |

\* 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).

## **CALCULATIONS**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

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, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm<sup>2</sup>

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

The power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by a factor of 10.

## **LIMITS**

From FCC §1.1310 Table 1 (B), the maximum value of  $S = 1.0 \text{ mW/cm}^2$

From IC Safety Code 6, Section 2.2 Table 5 Column 4,  $S = 10 \text{ W/m}^2$

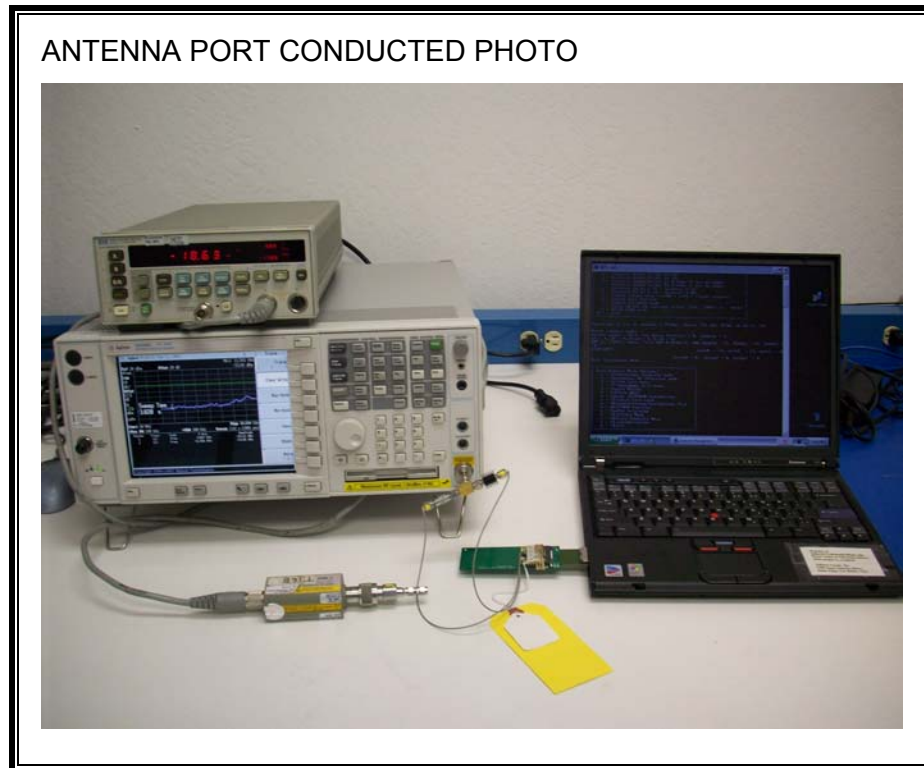
## **RESULTS**

(MPE distance is greater than 20 cm)

| Mode | Band    | FCC<br>Limit<br>(mW/cm <sup>2</sup> ) | IC<br>Limit<br>(W/m <sup>2</sup> ) | Output<br>(dBm) | Antenna<br>(dBi) | MPE<br>Distance<br>(cm) |
|------|---------|---------------------------------------|------------------------------------|-----------------|------------------|-------------------------|
| WLAN | 2.4 GHz | 1.0                                   | 10.0                               | 29.58           | 6.33             | 17.61                   |
| WLAN | 5 GHz   | 1.0                                   | 10.0                               | 29.86           | 6.76             | 19.11                   |

## 11. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP**

RADIATED FRONT PHOTO



RADIATED BACK PHOTO



**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**

LINE CONDUCTED FRONT PHOTO



LINE CONDUCTED BACK PHOTO



**END OF REPORT**