



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT**

**FOR**

**WIFI MODULE**

**MODEL NUMBER: DWM-W051**

**FCC ID: EW4DWMW051**

**IC: 420A-DWMW051**

**REPORT NUMBER: 12J14449-1, Revision A**

**ISSUE DATE: JULY 05, 2012**

*Prepared for*  
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**NVLAP LAB CODE 200065-0**

Revision History

| Rev. | Issue Date | Revisions                                                         | Revised By |
|------|------------|-------------------------------------------------------------------|------------|
| --   | 07/05/2012 | Initial Issue                                                     | T. Chan    |
| A    | 07/10/2012 | Revised Output Power Procedure on section 7.1.3, 7.2.3, and 7.3.3 | T. Chan    |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** MITSUMI ELECTRIC CO., LTD.  
1601, SAKAI, ASUGI-SHI,  
KANAGAWA, 243-8533 JAPAN

**EUT DESCRIPTION:** WIFI MODULE

**MODEL:** DWM-W051

**SERIAL NUMBER:** 40F407309D81

**DATE TESTED:** JUNE 14 TO JUNE 29, 2012

| APPLICABLE STANDARDS                    |              |
|-----------------------------------------|--------------|
| STANDARD                                | TEST RESULTS |
| CFR 47 Part 15 Subpart C                | Pass         |
| INDUSTRY CANADA RSS-210 Issue 8 Annex 8 | Pass         |
| INDUSTRY CANADA RSS-GEN Issue 3         | Pass         |

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

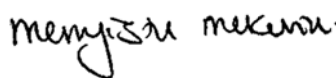
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of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

Approved & Released For UL CCS By:

Tested By:



THU CHAN  
EMC SUPERVISOR  
UL CCS



MENGISTU MEKURIA  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

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

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

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

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

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is WiFi Module with 802.11bgn(HT20).

The radio module is manufactured by Mitsumi Electric Co., Ltd.

### 5.2. MAXIMUM OUTPUT POWER

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

| Frequency Range (MHz) | Mode         | Output Power (dBm) | Output Power (mW) |
|-----------------------|--------------|--------------------|-------------------|
| 2412 - 2462           | 802.11b      | 19.49              | 88.92             |
| 2412 - 2462           | 802.11g      | 24.14              | 259.42            |
| 2412 - 2462           | 802.11n HT20 | 23.25              | 211.35            |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for TX/RX diversity, with a maximum peak gain of 2.05dBi.

### 5.4. SOFTWARE AND FIRMWARE

The EUT test utility software installed in the host computer during testing was Broadcom test program BCM43362SDGN6L version 5.90.153.37 WLTEST.

### 5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11b mode were made at 1 Mb/s.

All final tests in the 802.11g mode were made at 6 Mb/s.

All final tests in the 802.11n HT20 SISO mode were made at MCS0.

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

To determine the worst-position of highest emissions, the EUT's antenna was investigated for X, Y, Z positions, and the worst position was turned out to be a Y-position with long ends at left side.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |                |                              |        |
|------------------------|--------------|----------------|------------------------------|--------|
| Description            | Manufacturer | Model          | Serial Number                | FCC ID |
| Laptop                 | Dell         | Latitude E6400 | 19728586900                  | N/A    |
| AC Adapter             | Dell         | FA90PE1-00     | CN-0CM889-73245-91F-4706-A00 | DoC    |
| Adapter Board          | Mitsumi      | DWM-W051       | N/A                          | N/A    |

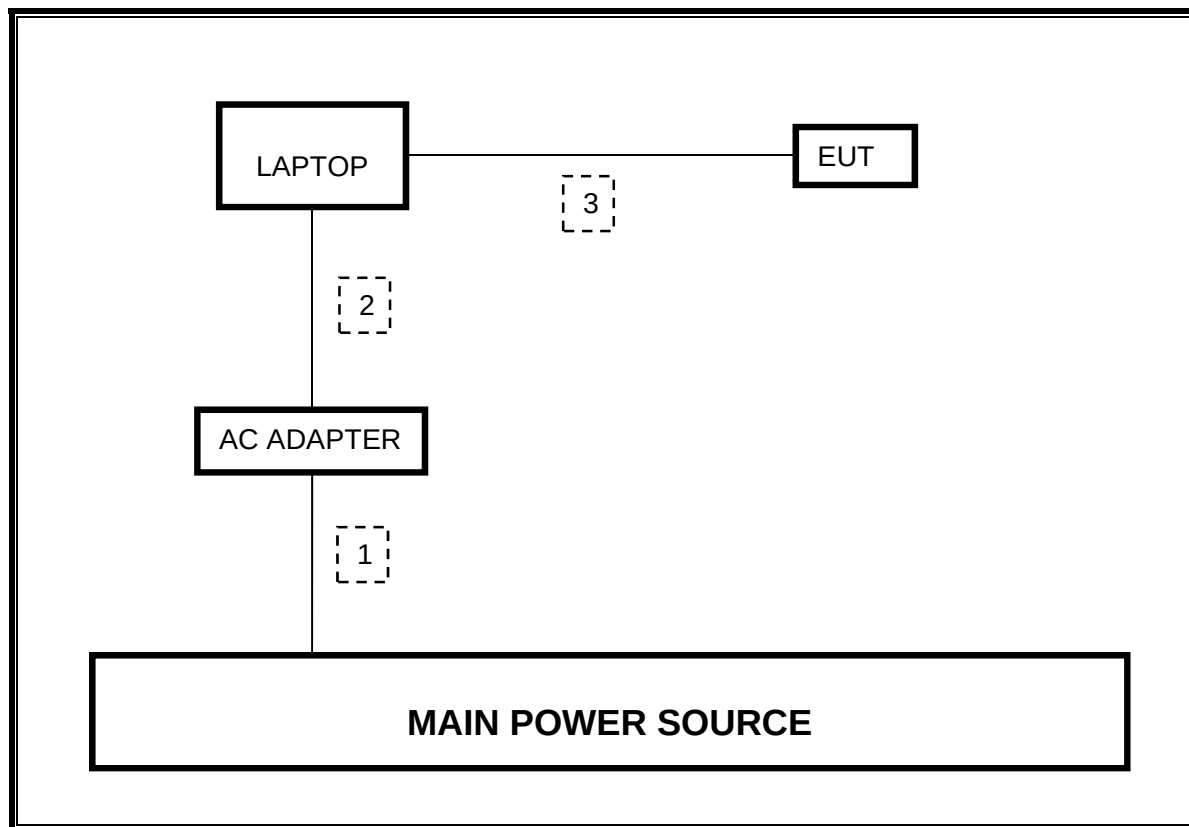
### I/O CABLES

| I/O Cable List |      |                      |                |             |                  |                      |
|----------------|------|----------------------|----------------|-------------|------------------|----------------------|
| Cable No       | Port | # of identical ports | Connector Type | Cable Type  | Cable Length (m) | Remarks              |
| 1              | AC   | 1                    | 3-Pong AC      | Un-Shielded | 2.0m             | N/A                  |
| 2              | DC   | 1                    | DC             | Un-Shielded | 2.0m             | Ferrite Core one End |
| 3              | Data | 1                    | 20 Pins        | Un-Shielded | 0.2m             | Ribbon Cable         |

### TEST SETUP

The EUT is connected to the host laptop computer via ribbon cable and test jig board during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List         |                |                |        |            |
|-----------------------------|----------------|----------------|--------|------------|
| Description                 | Manufacturer   | Model          | Asset  | Cal Due    |
| Spectrum Analyzer, 26.5 GHz | Agilent / HP   | E4440A         | C01179 | 2013/2/16  |
| Spectrum Analyzer, 44 GHz   | Agilent / HP   | E4446A         | C00986 | 2013/3/22  |
| Spectrum Analyzer, 44 GHz   | Agilent / HP   | E4446A         | C00996 | 2013/5/11  |
| EMI Test Receiver, 30 MHz   | R & S          | ESHS 20        | N02396 | 2013/8/19  |
| Power Meter                 | Agilent / HP   | 437B           | N/A    | 2012/7/29  |
| Power Sensor, 18 GHz        | Agilent / HP   | 8481A          | N/A    | 08/04/12   |
| Preamp, 1000MHz             | Sonoma         | 310N           | N02891 | 2013/2/21  |
| Preamplifier, 26.5 GHz      | Agilent / HP   | 8449B          | C01052 | 2012/7/12  |
| Preamplifier, 26.5 GHz      | Agilent / HP   | 8449B          | C01063 | 2012/7/12  |
| Antenna, Horn, 18 GHz       | EMCO           | 3115           | C00945 | 2012/10/6  |
| Antenna, Bilog, 30MHz-1 GHz | Sunol Sciences | JB1            | C01011 | 2013/3/23  |
| LISN, 30 MHz                | FCC            | 50/250-25-2    | C00626 | 2012/12/13 |
| LISN, 10 kHz ~ 30 MHz       | Solar          | 012-50-R-24-BN | N02481 | 2013/3/7   |
| Horn Antenna, 26 GHz        | ARA            | MVH-1826/B     | C00589 | 201/7/28   |

## 7. ANTENNA PORT TEST RESULTS

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

#### 7.1.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

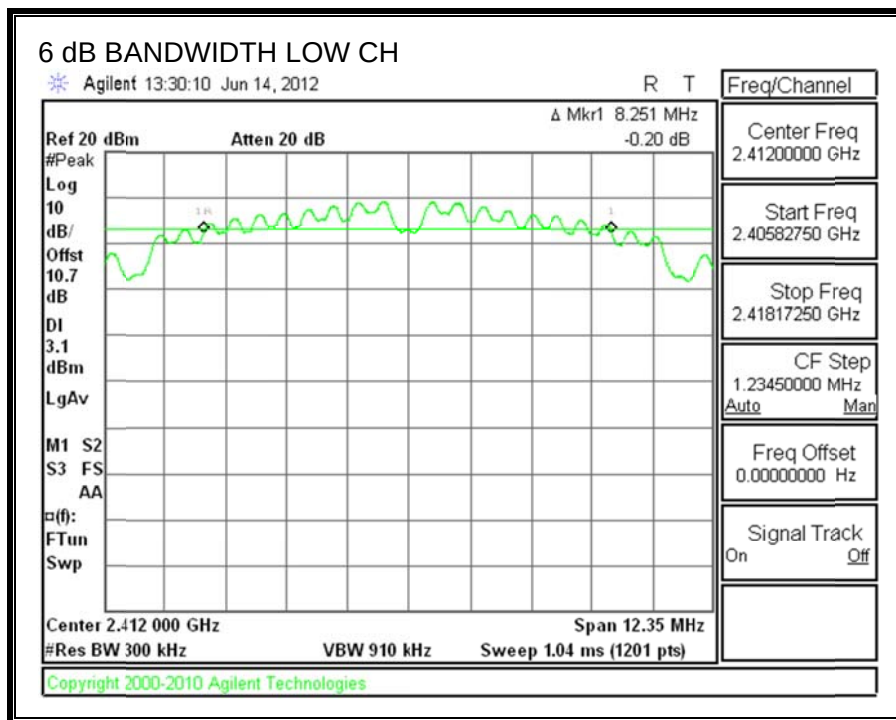
##### TEST PROCEDURE

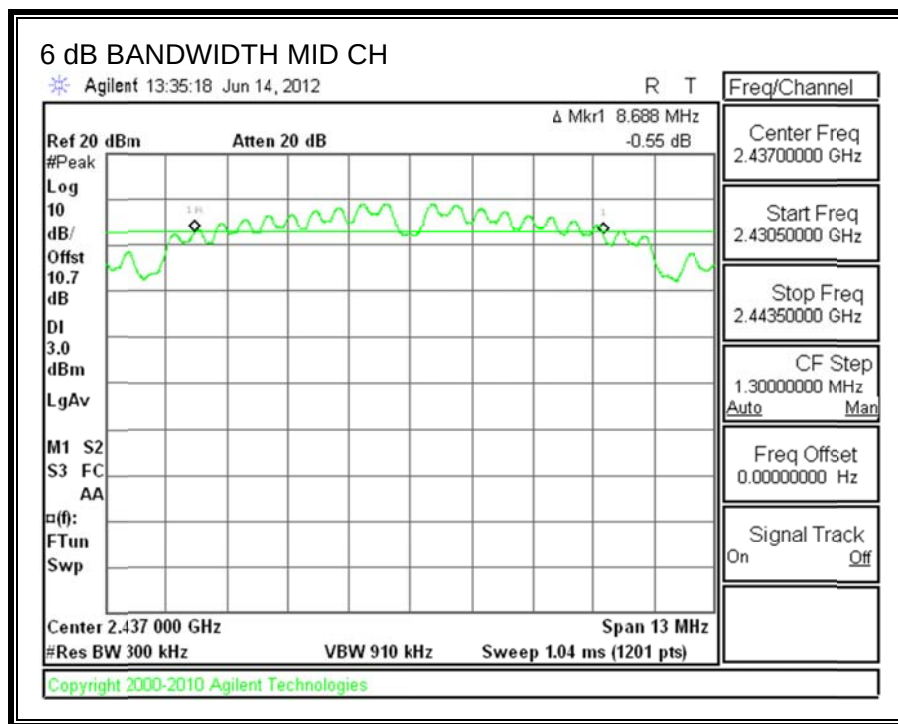
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

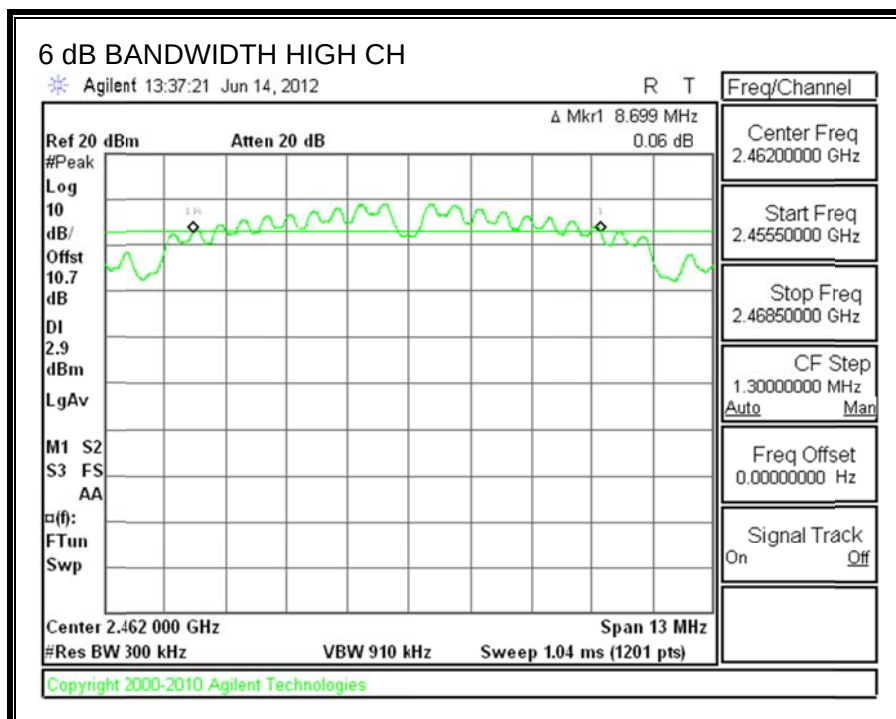
##### RESULTS

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2412            | 8.2510               | 0.5                 |
| Middle  | 2437            | 8.6880               | 0.5                 |
| High    | 2462            | 8.6990               | 0.5                 |

# **6 dB BANDWIDTH**







### 7.1.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

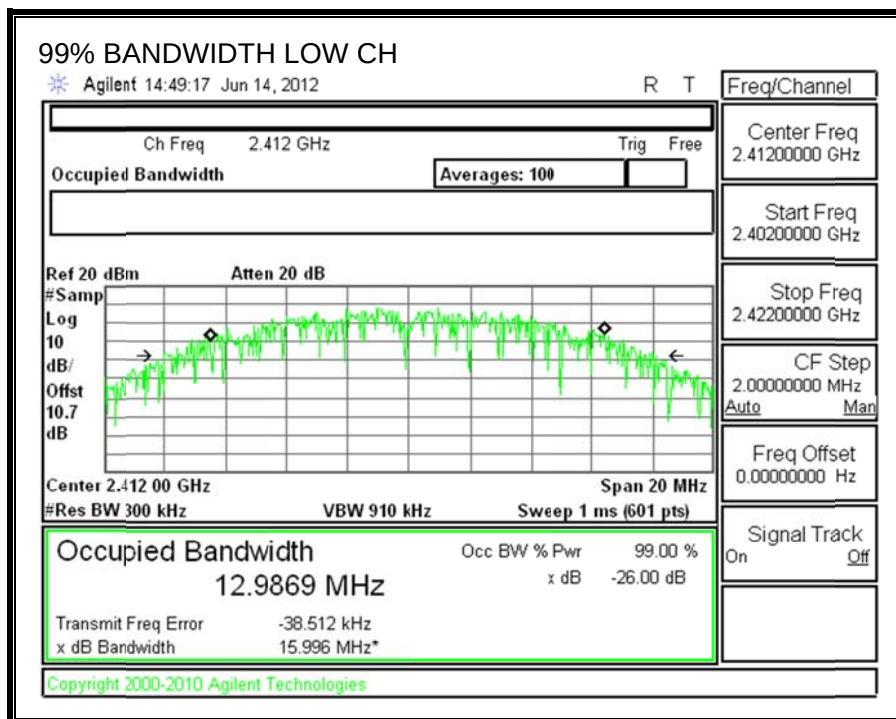
#### TEST PROCEDURE

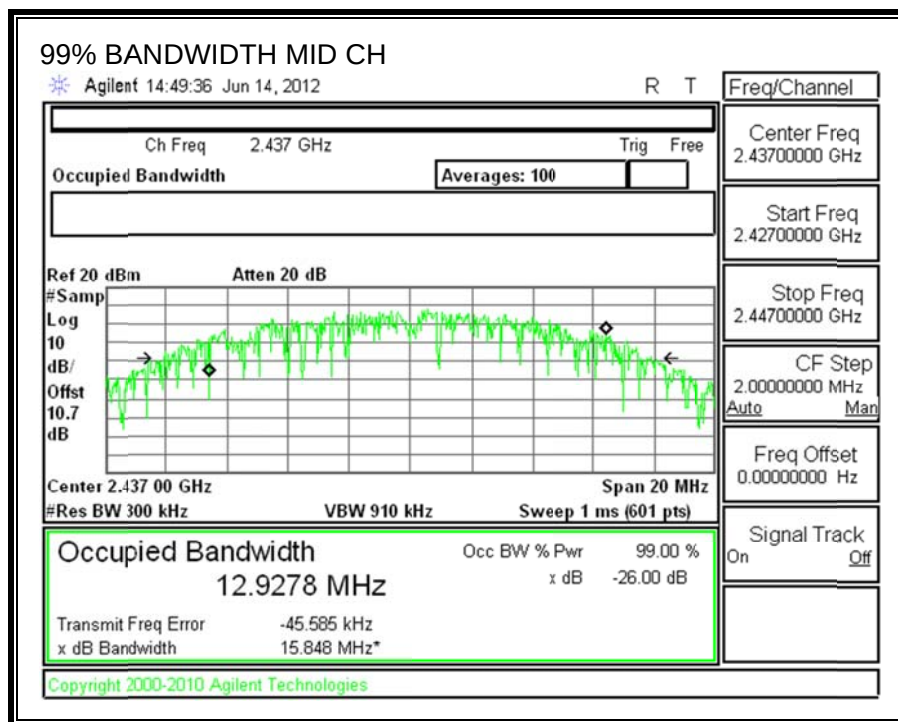
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

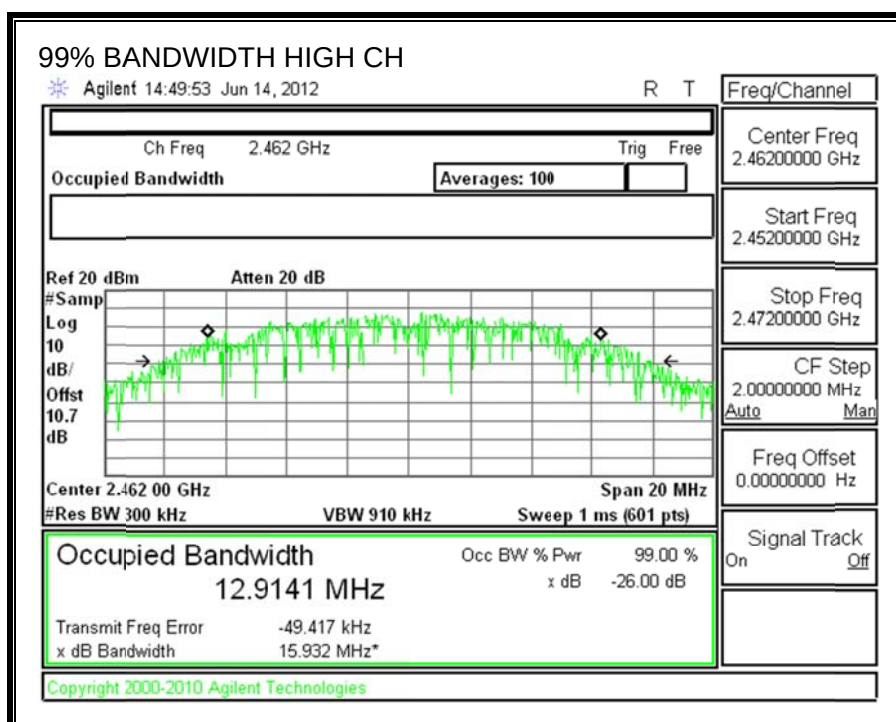
#### RESULTS

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2412               | 12.9869                |
| Middle  | 2437               | 12.9278                |
| High    | 2462               | 12.9141                |

**99% BANDWIDTH**







### 7.1.3. 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.

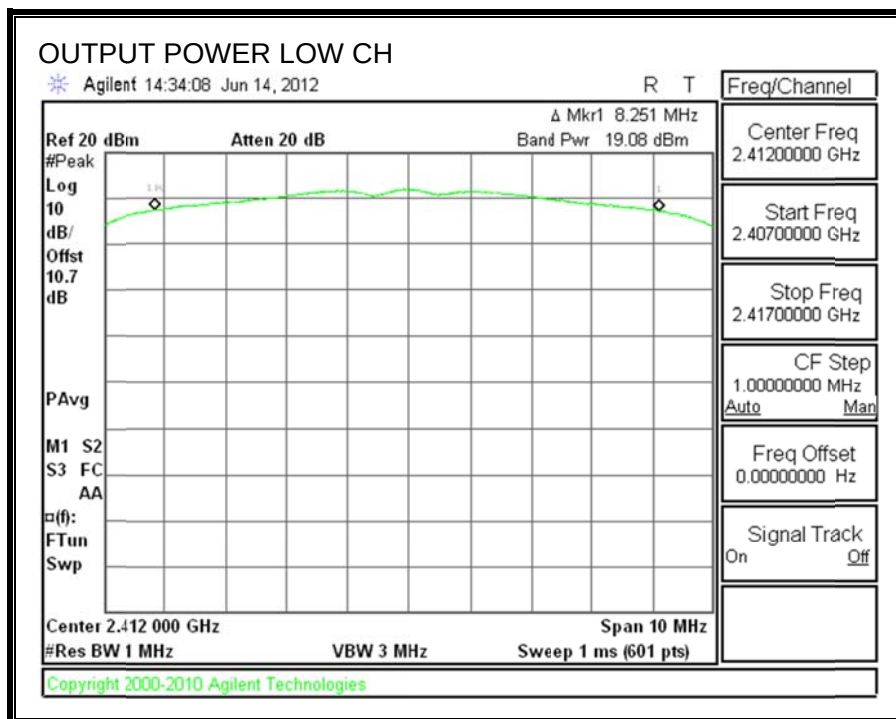
#### TEST PROCEDURE

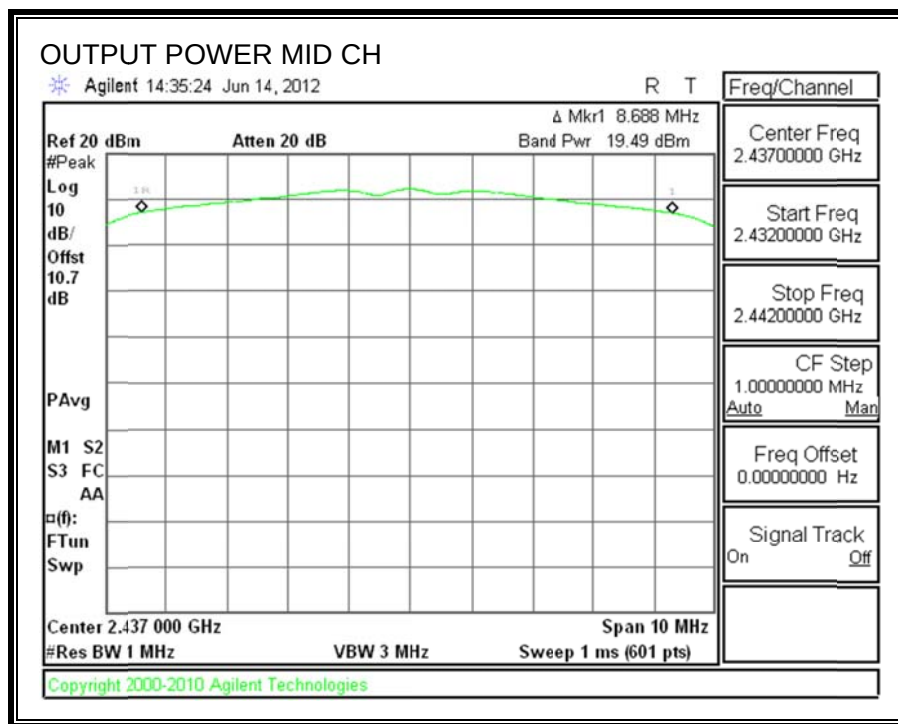
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

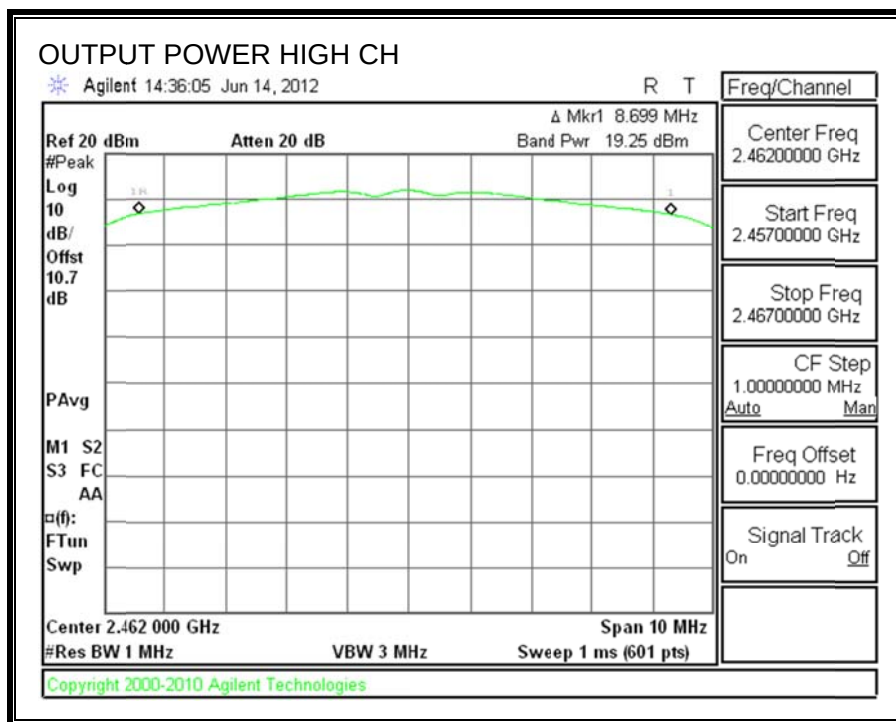
#### RESULTS

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 19.080                         | 30             | -10.920        |
| Middle  | 2437               | 19.490                         | 30             | -10.510        |
| High    | 2462               | 19.250                         | 30             | -10.750        |

## 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 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | AV power (dBm) |
|---------|-----------------|----------------|
| Low     | 2412            | 15.81          |
| Middle  | 2437            | 15.71          |
| High    | 2462            | 15.81          |

## 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

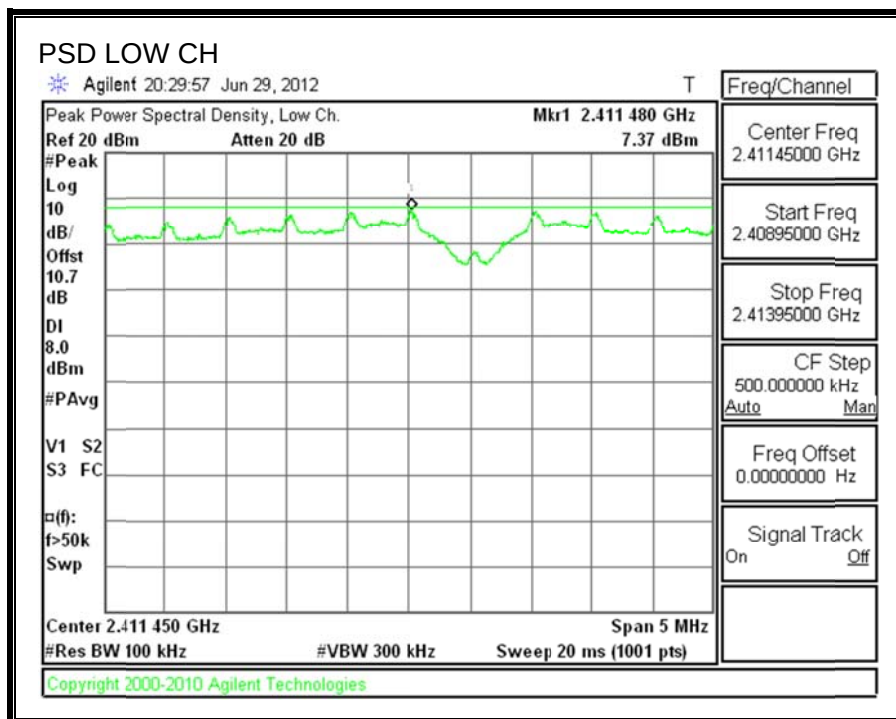
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

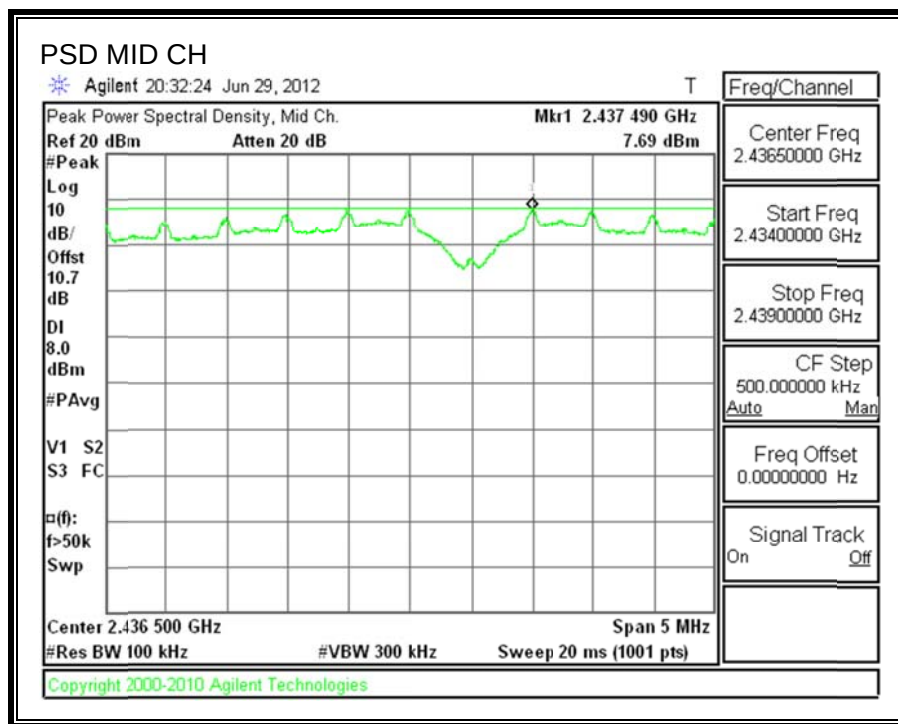
### RESULTS

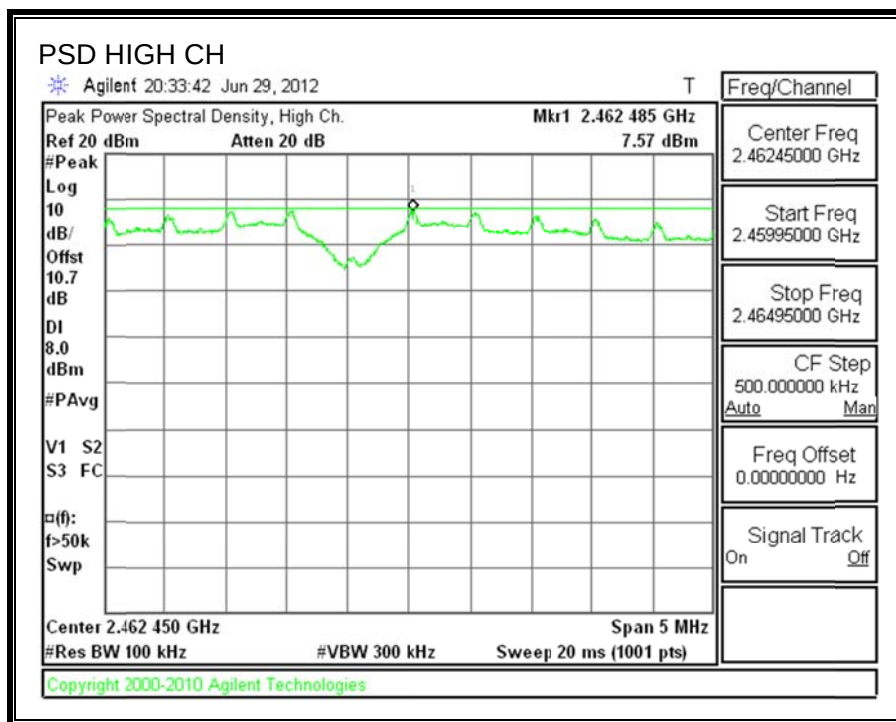
| Channel | Frequency (MHz) | PSD/100kHz (dBm) | PSD/3kHz (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|------------------|----------------|-------------|-------------|
| Low     | 2412            | 7.37             | -7.83          | 8           | -15.83      |
| Middle  | 2437            | 7.69             | -7.51          | 8           | -15.51      |
| High    | 2462            | 7.57             | -7.63          | 8           | -15.63      |

Note: Conversion factor to an equivalent value in 3 kHz for comparison to the limit is;  
 $10\log(3\text{kHz}/100\text{kHz}) = -15.2\text{dB}$

**POWER SPECTRAL DENSITY**







## **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.

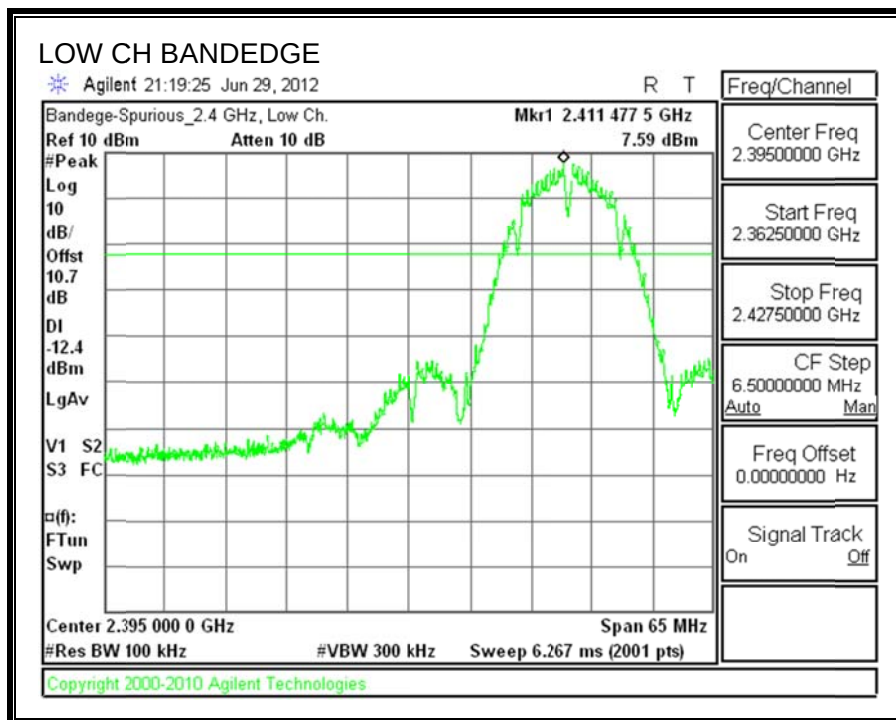
### **TEST PROCEDURE**

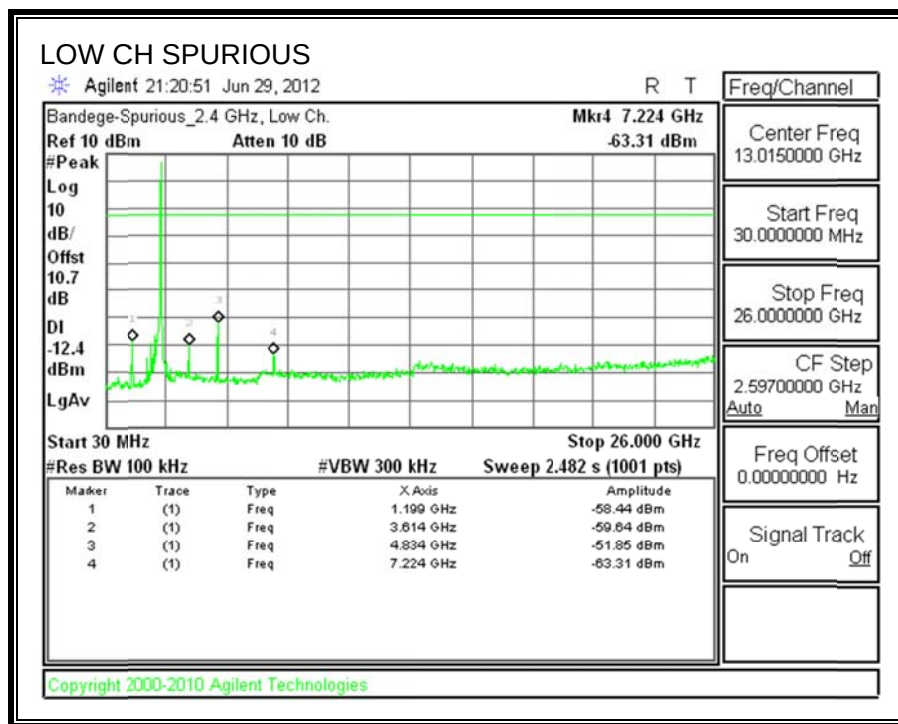
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

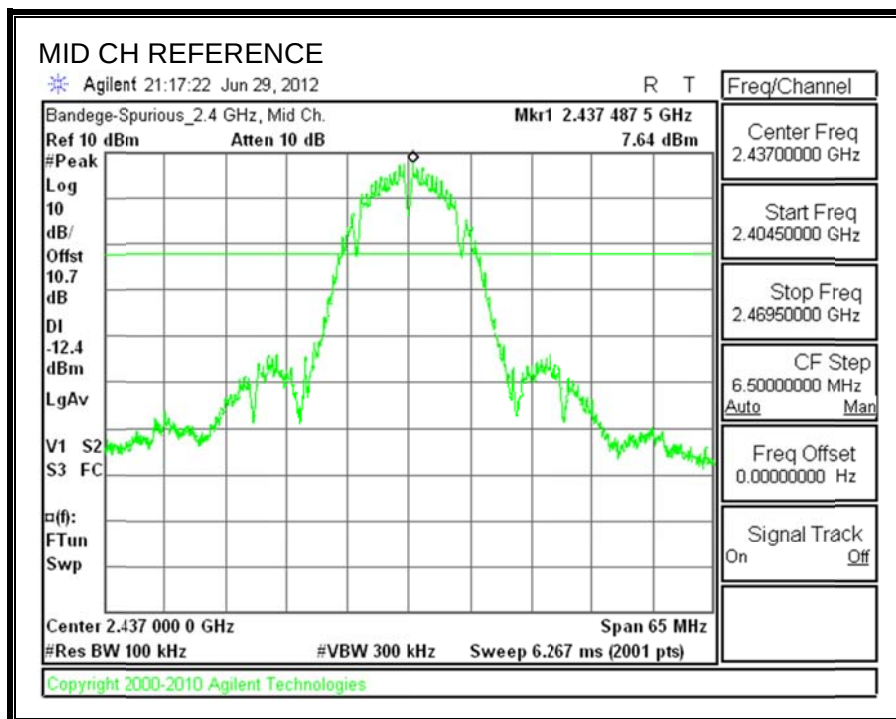
## RESULTS

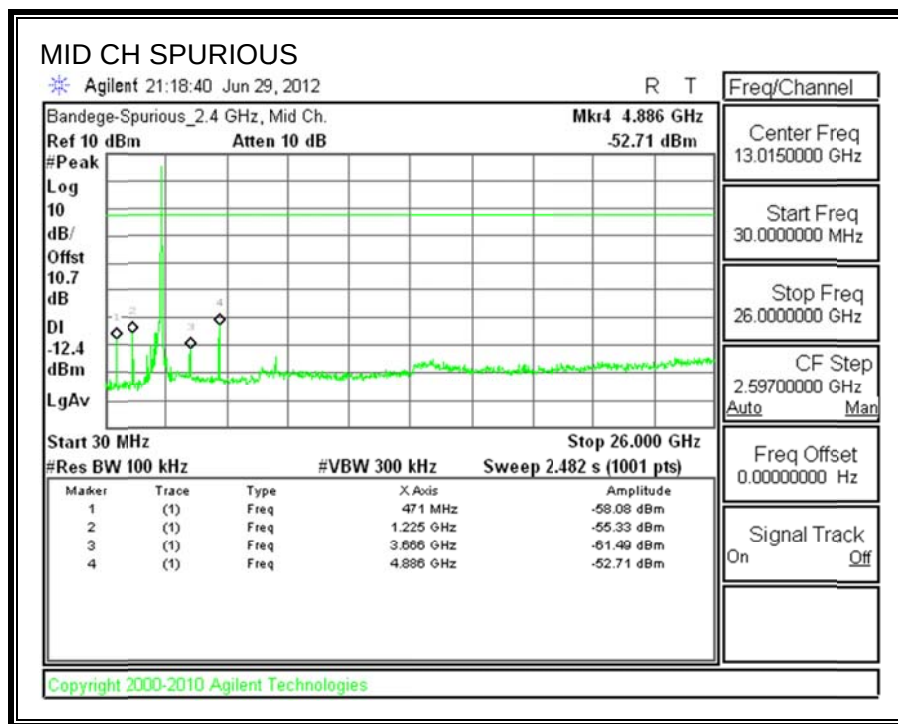
### SPURIOUS EMISSIONS, LOW CHANNEL



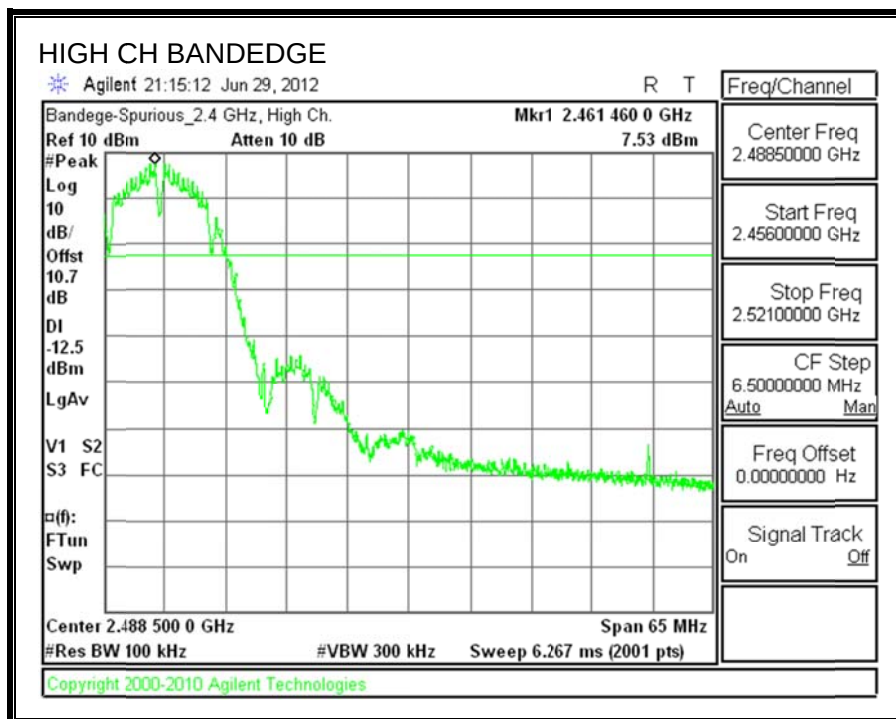


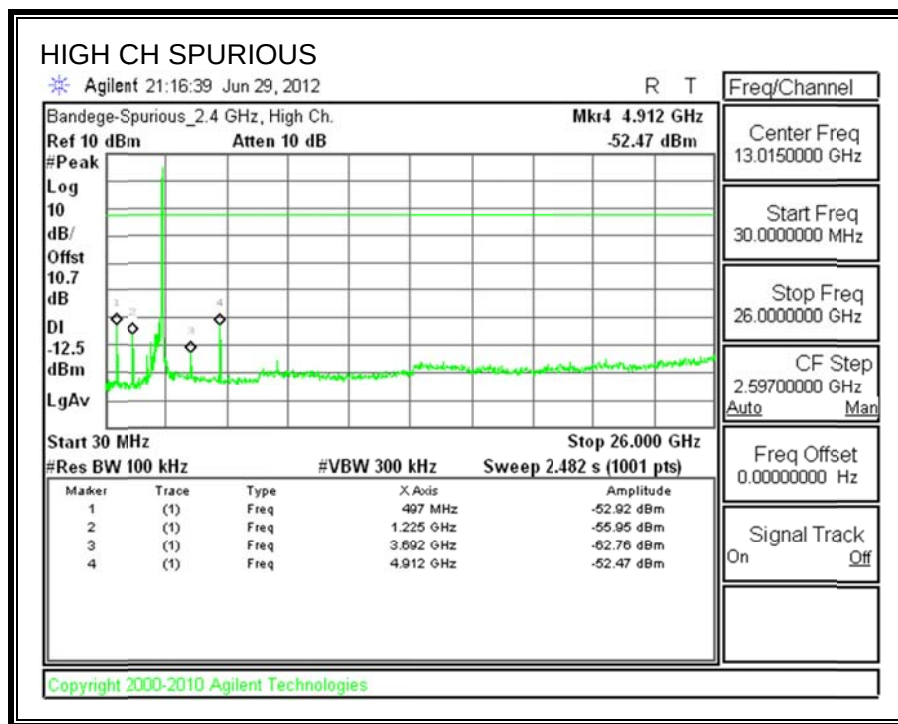
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





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

### 7.2.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

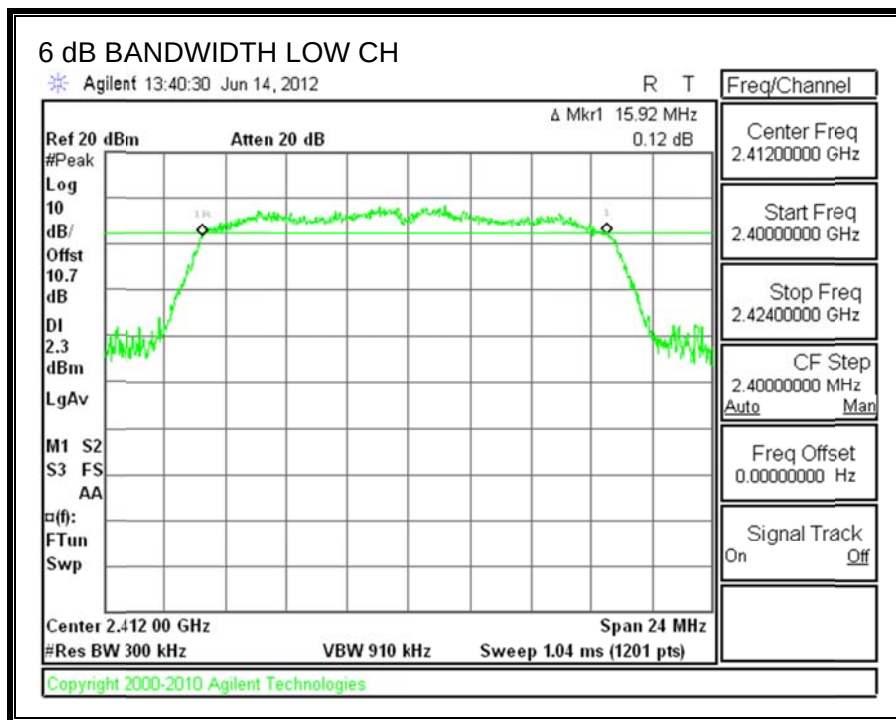
#### TEST PROCEDURE

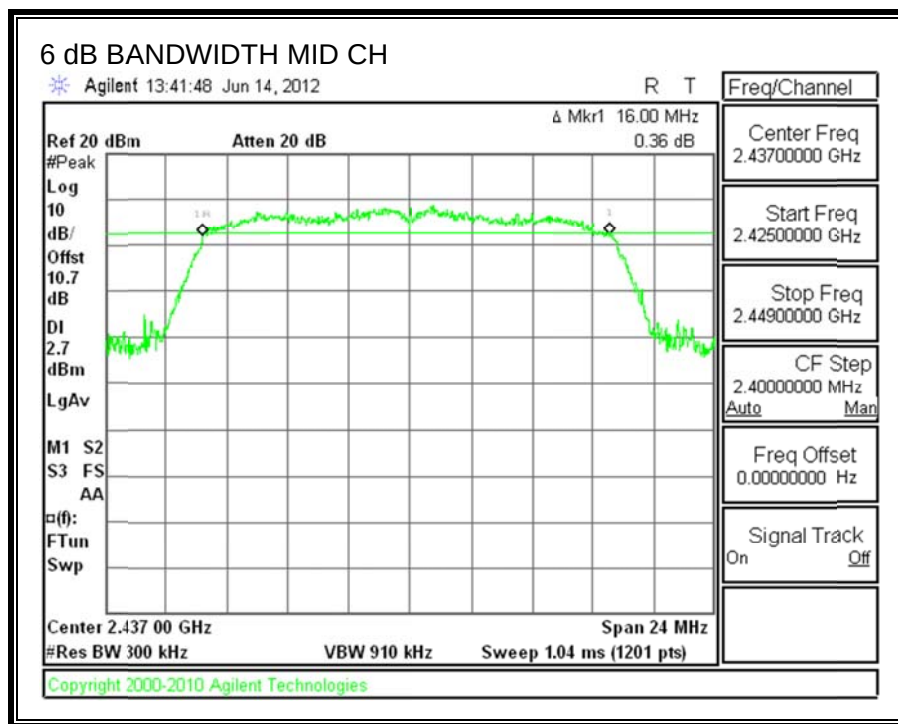
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

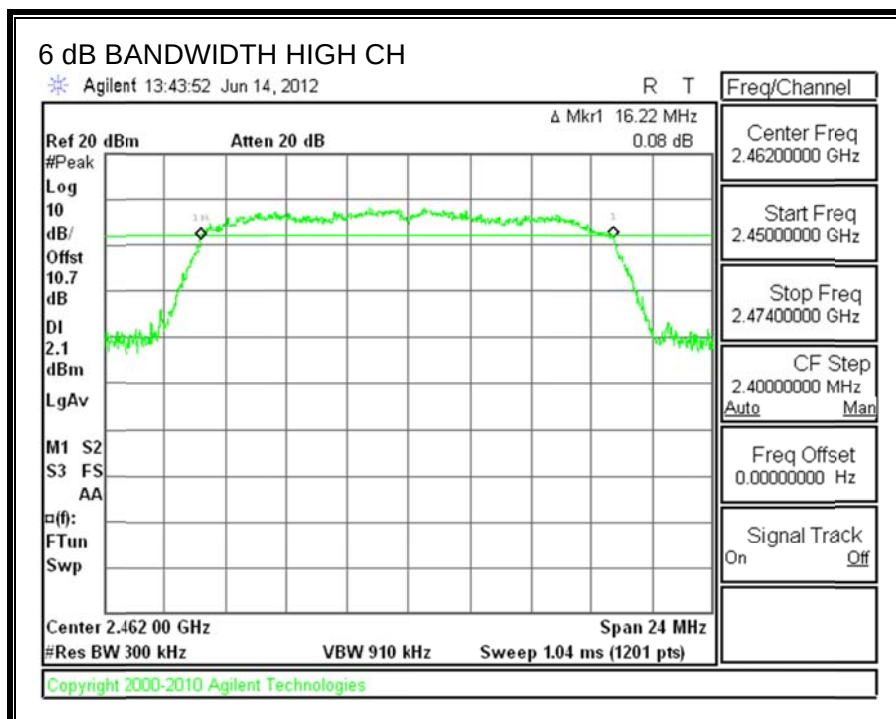
#### RESULTS

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2412            | 15.9200              | 0.5                 |
| Middle  | 2437            | 16.0000              | 0.5                 |
| High    | 2462            | 16.2200              | 0.5                 |

# **6 dB BANDWIDTH**







## 7.2.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

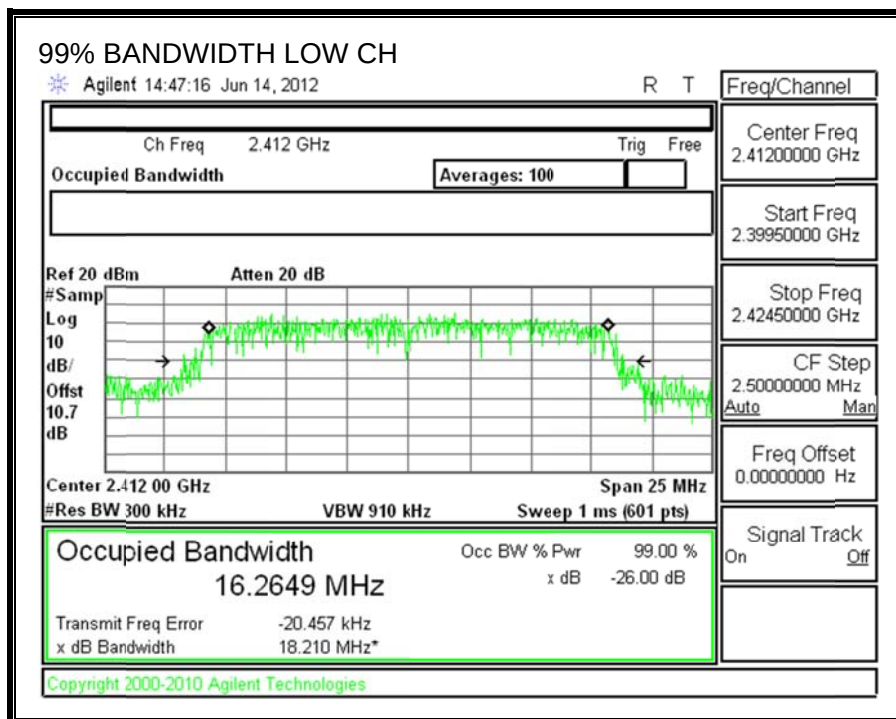
### TEST PROCEDURE

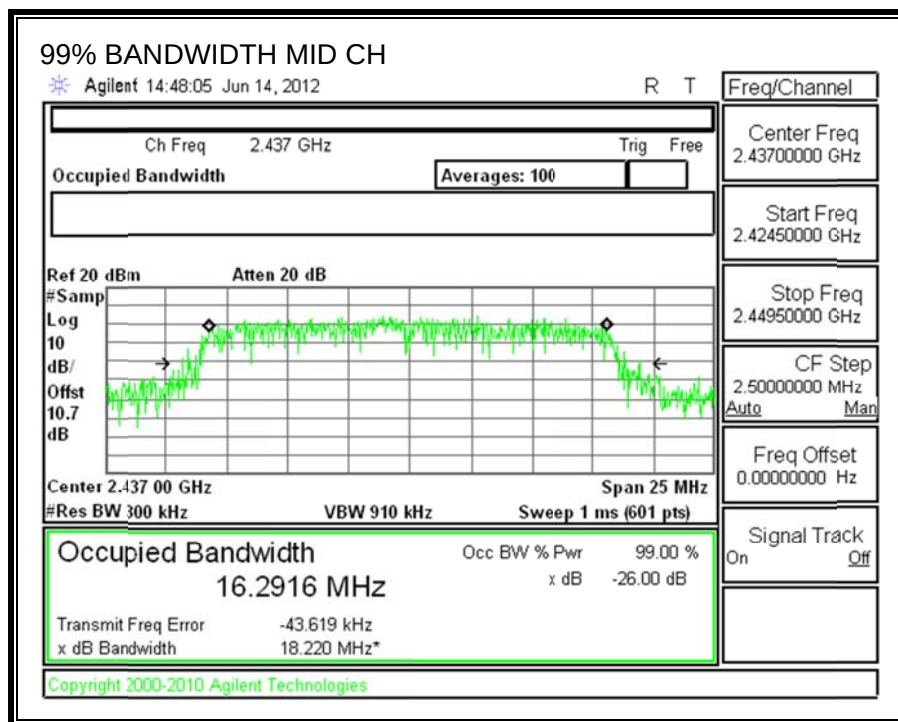
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

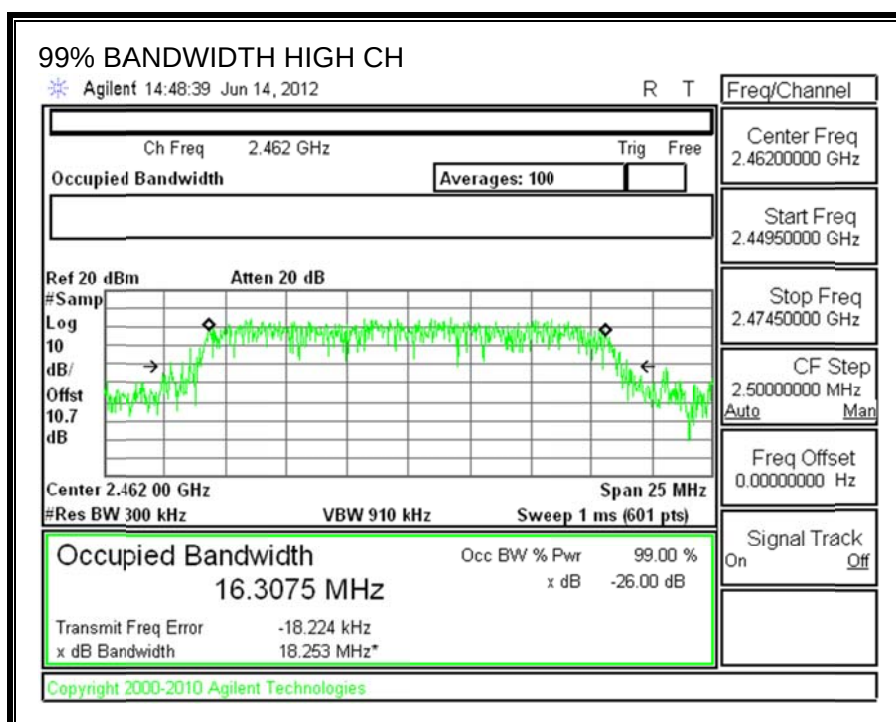
### RESULTS

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2412               | 16.2649                |
| Middle  | 2437               | 16.2916                |
| High    | 2462               | 16.3075                |

**99% BANDWIDTH**







### 7.2.3. 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.

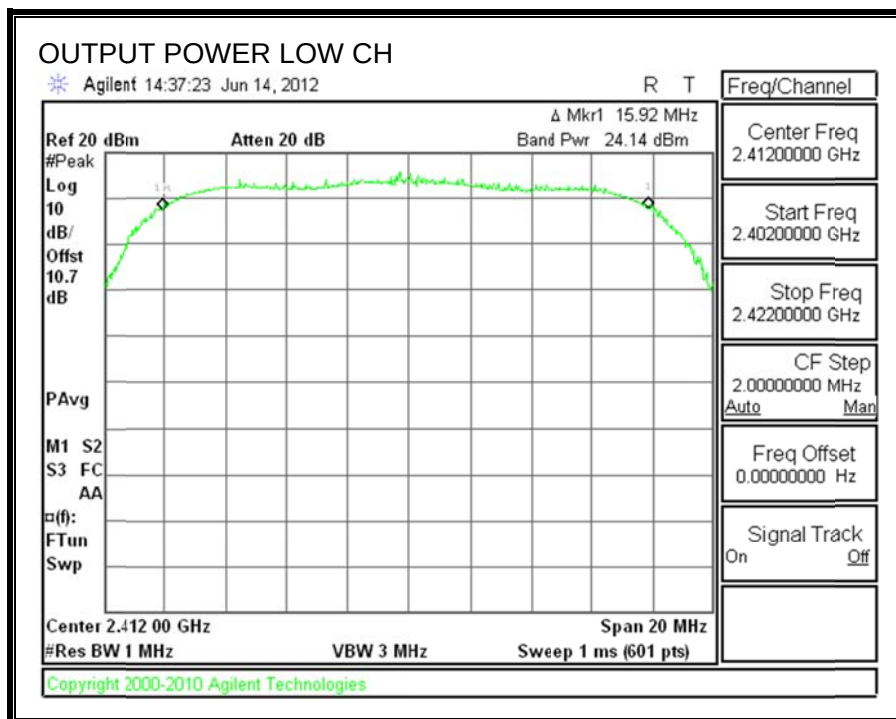
#### TEST PROCEDURE

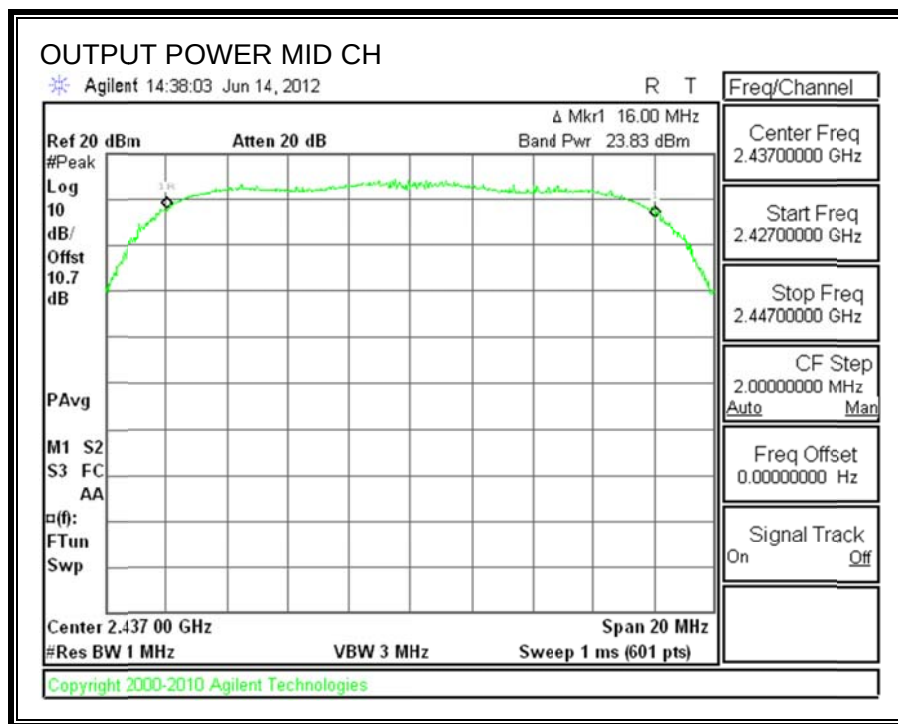
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

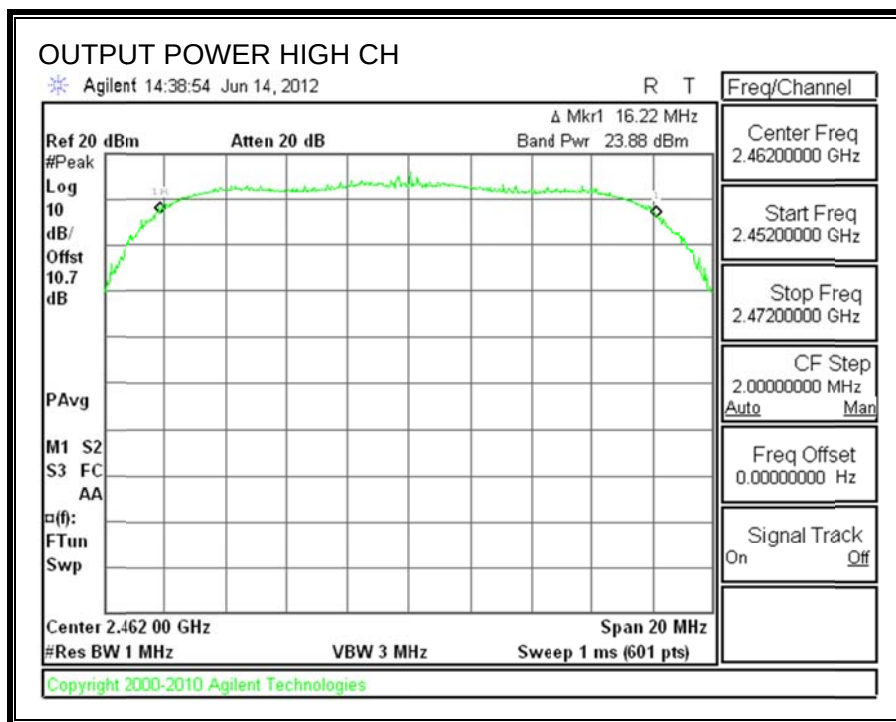
#### RESULTS

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 24.14                          | 30             | -5.86          |
| Middle  | 2437               | 23.83                          | 30             | -6.17          |
| High    | 2462               | 23.88                          | 30             | -6.12          |

## 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 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Power<br>(dBm) |
|---------|--------------------|----------------|
| Low     | 2412               | 15.04          |
| Middle  | 2437               | 14.97          |
| High    | 2462               | 14.96          |

## 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

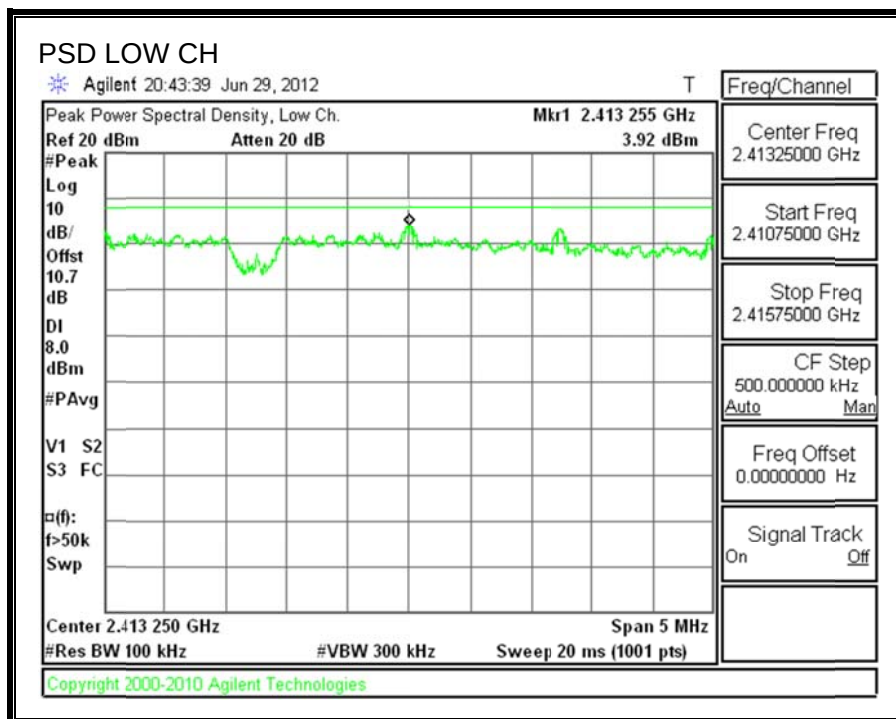
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

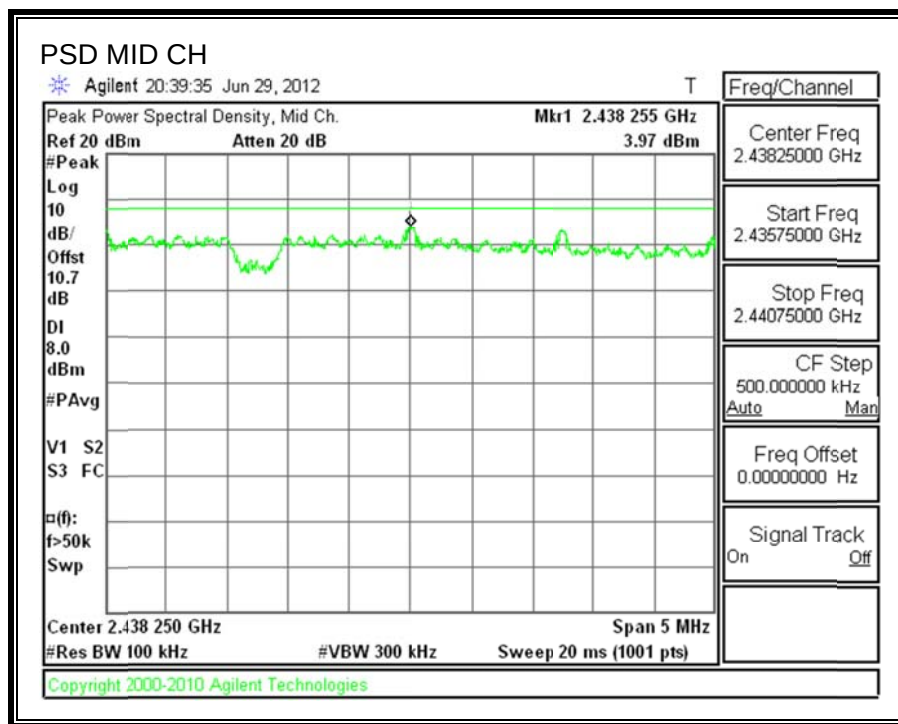
### RESULTS

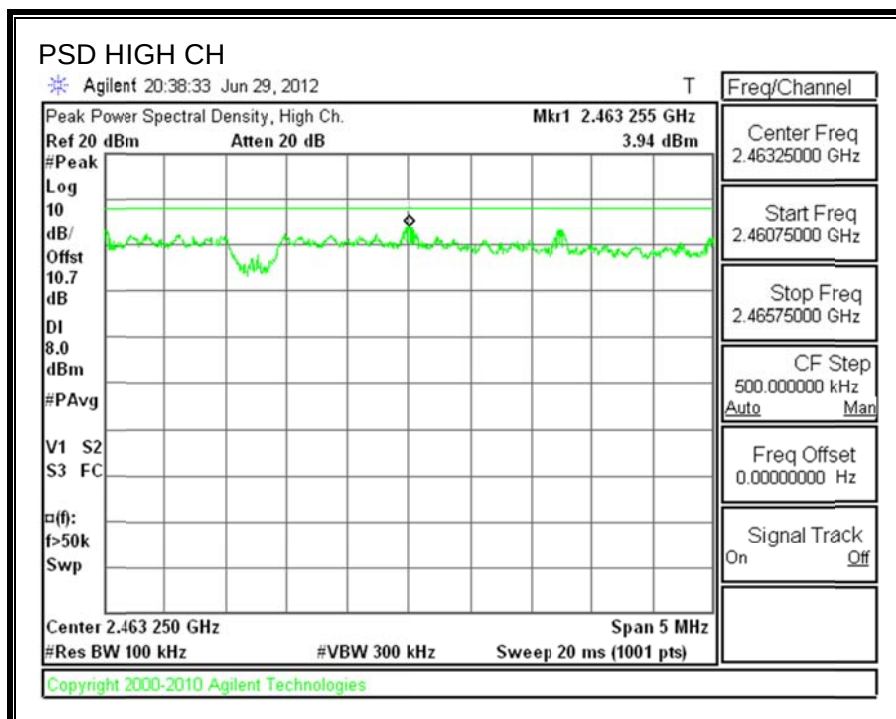
| Channel | Frequency (MHz) | PSD/100kHz (dBm) | PSD/3kHz (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|------------------|----------------|-------------|-------------|
| Low     | 2412            | 3.92             | -11.28         | 8           | -19.28      |
| Middle  | 2437            | 3.97             | -11.23         | 8           | -19.23      |
| High    | 2462            | 3.94             | -11.26         | 8           | -19.26      |

Note: Conversion factor to an equivalent value in 3 kHz for comparison to the limit is;  
 $10\log(3\text{kHz}/100\text{kHz}) = -15.2\text{dB}$

**POWER SPECTRAL DENSITY**







## **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.

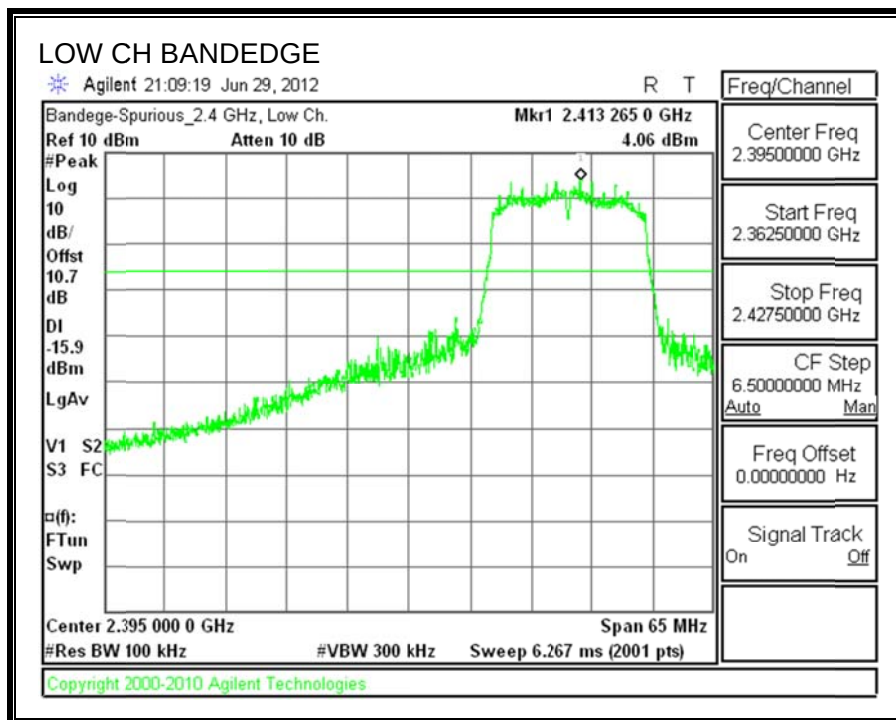
### **TEST PROCEDURE**

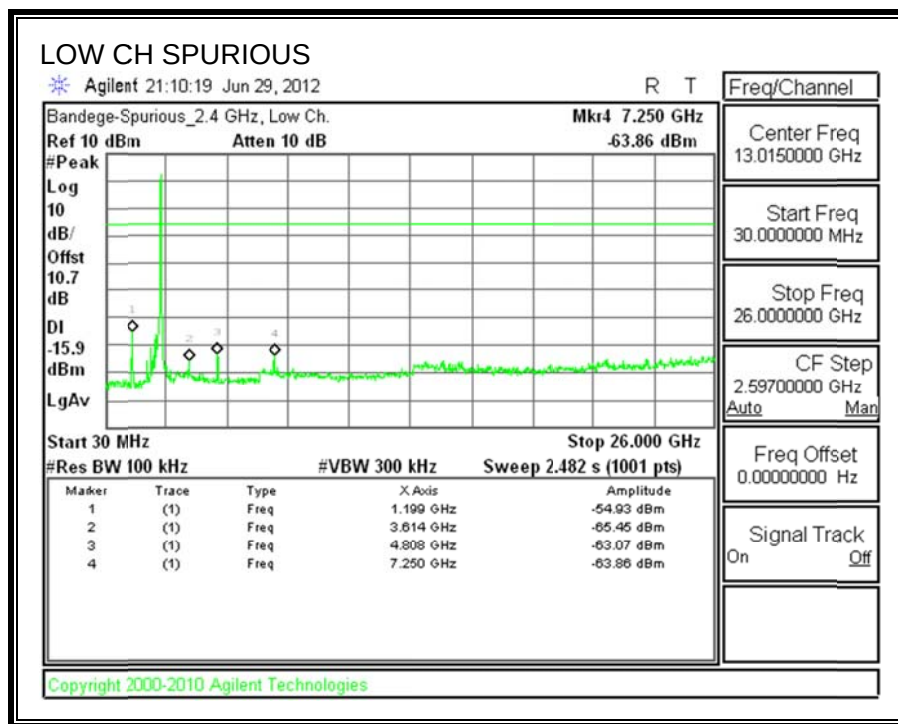
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

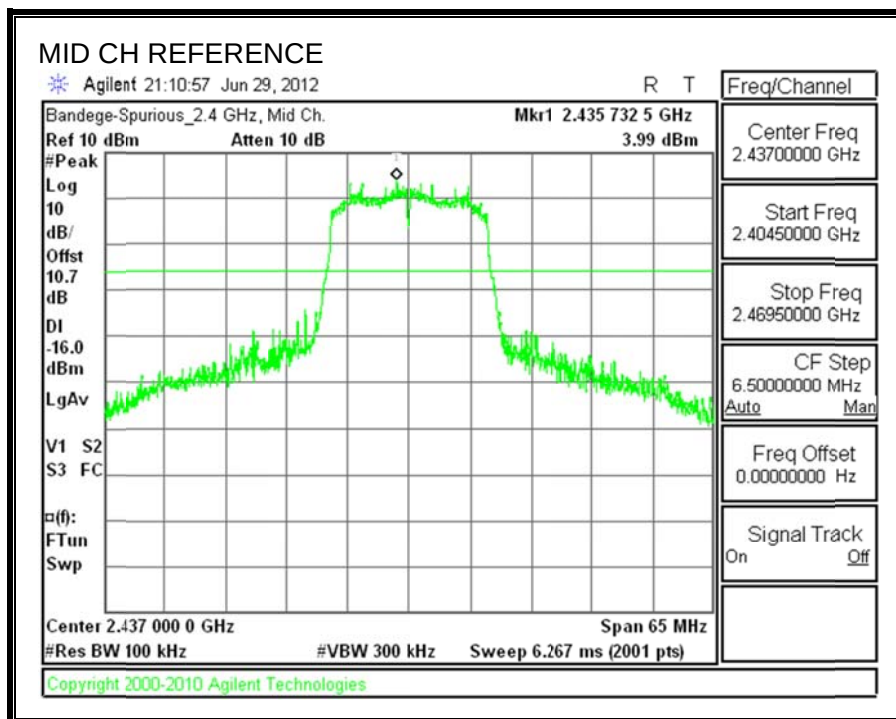
## RESULTS

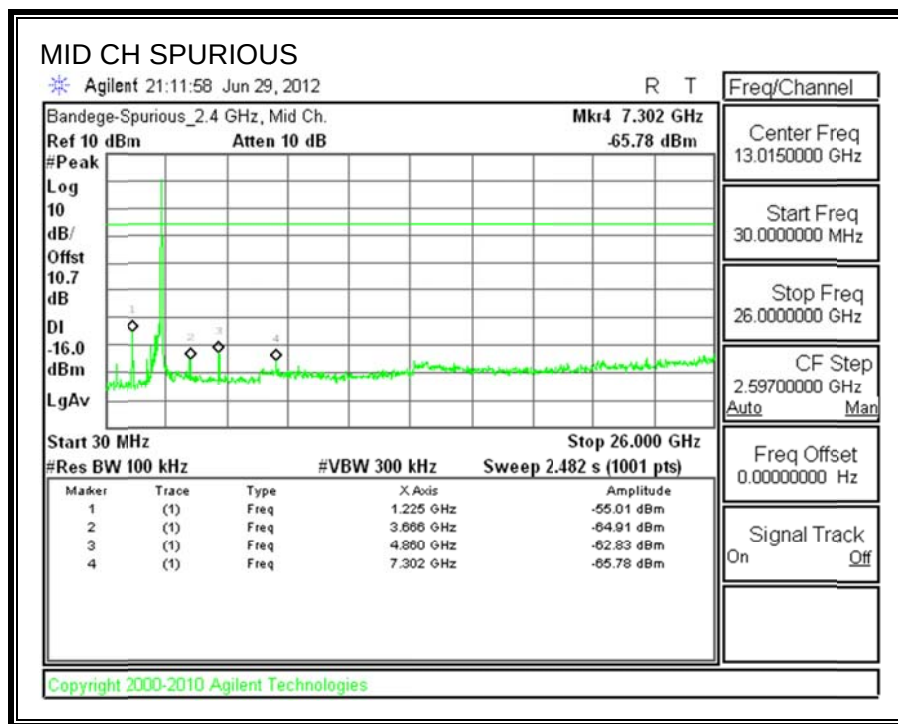
### SPURIOUS EMISSIONS, LOW CHANNEL



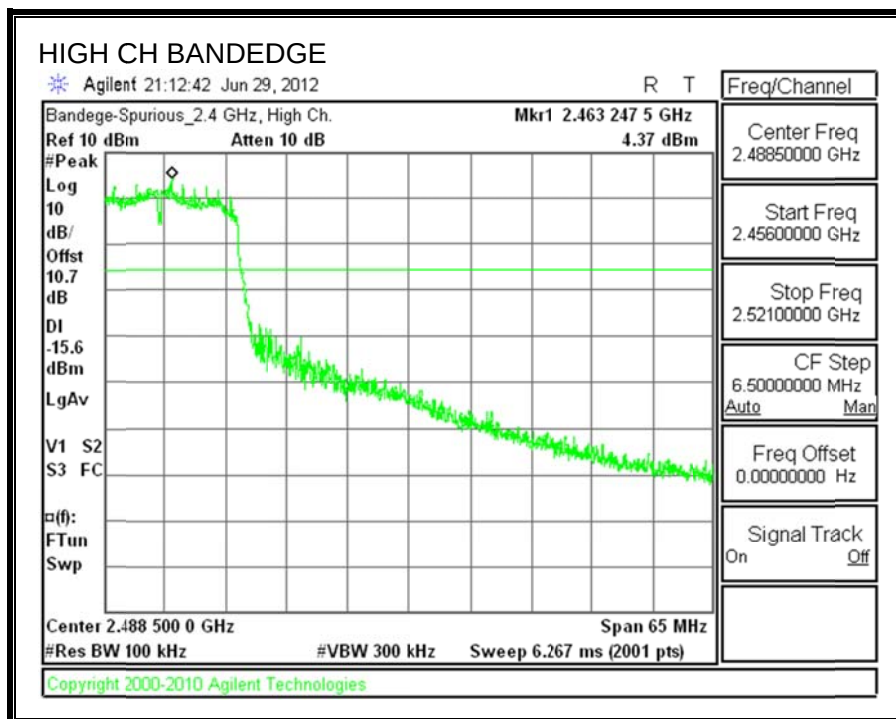


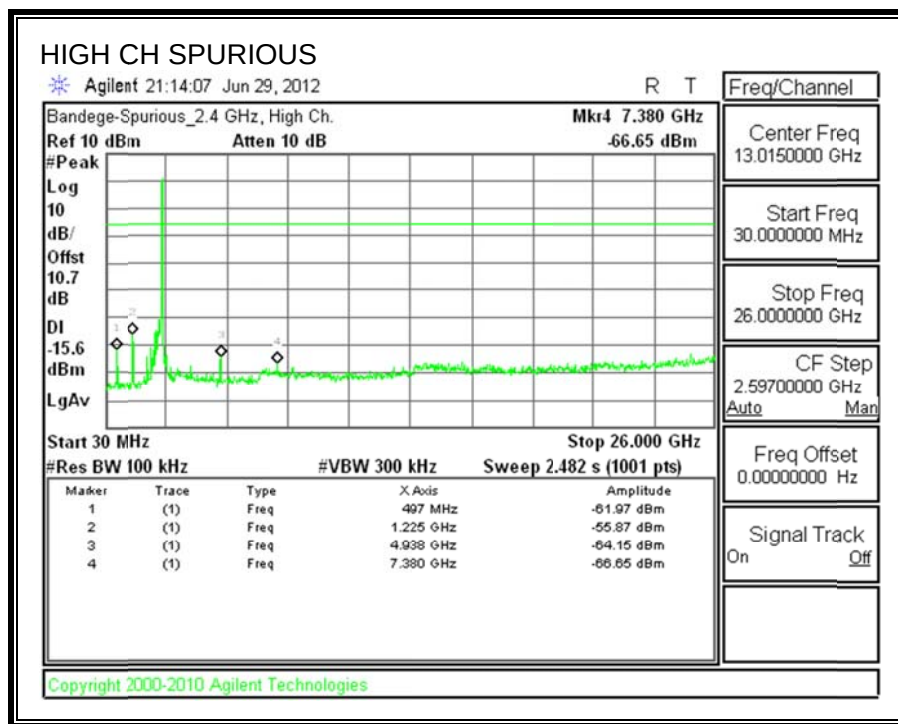
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





### 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.

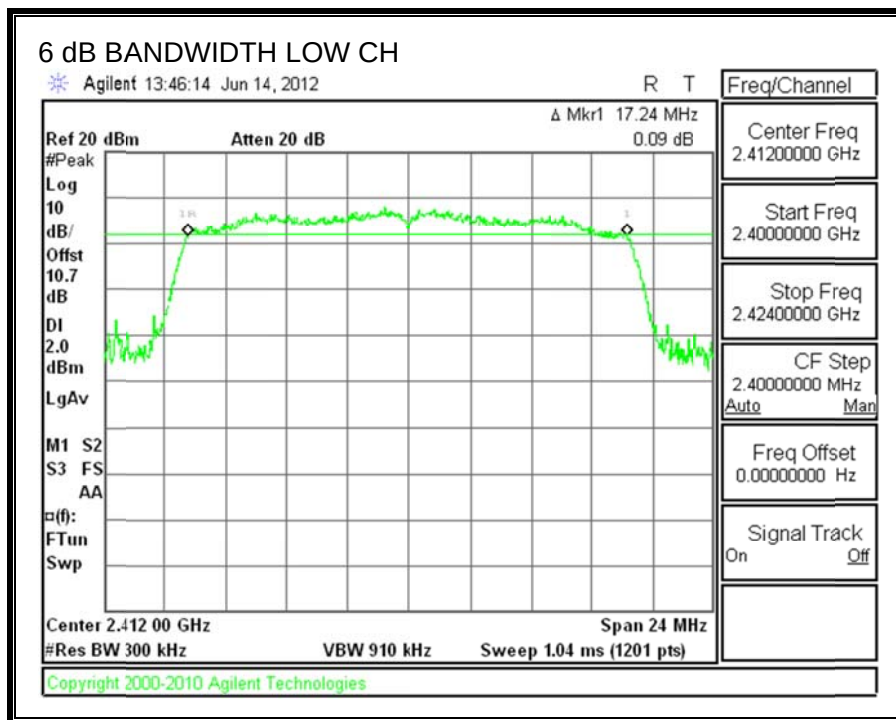
##### TEST PROCEDURE

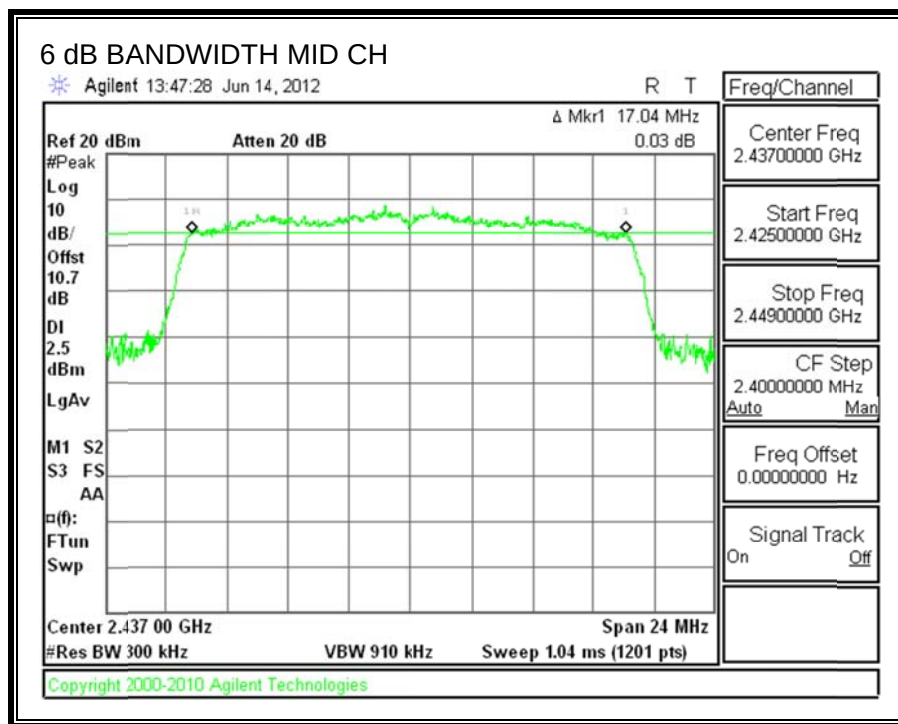
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

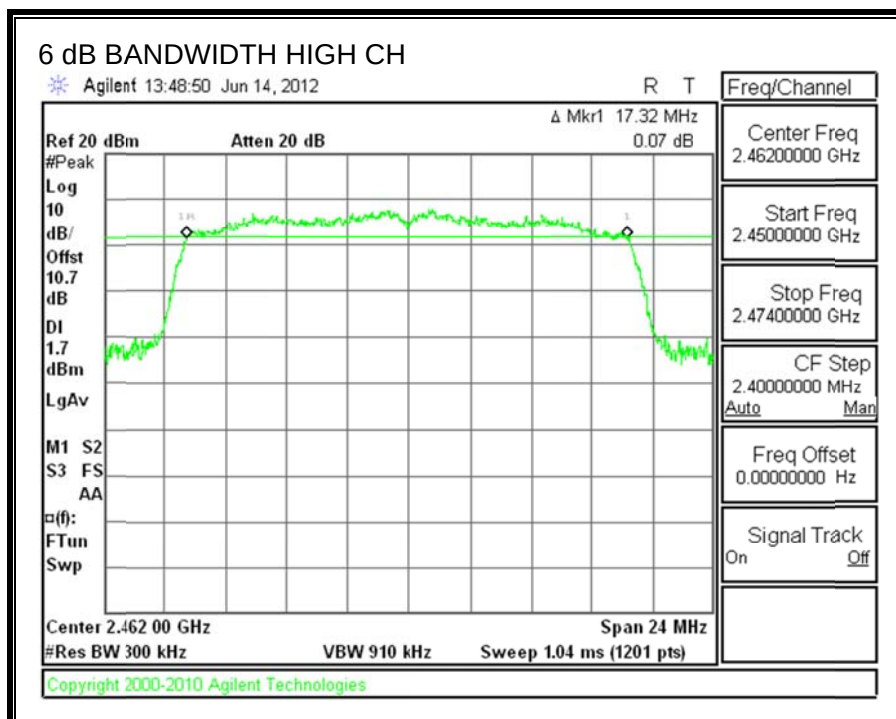
##### RESULTS

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2412            | 17.2400              | 0.5                 |
| Middle  | 2437            | 17.0400              | 0.5                 |
| High    | 2462            | 17.3200              | 0.5                 |

# **6 dB BANDWIDTH**







### 7.3.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

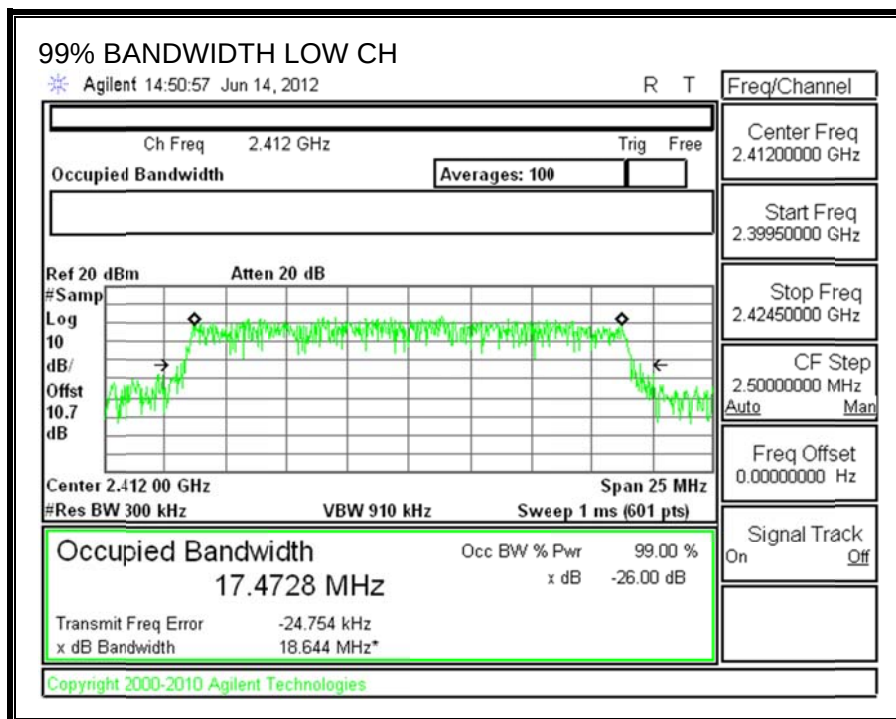
#### TEST PROCEDURE

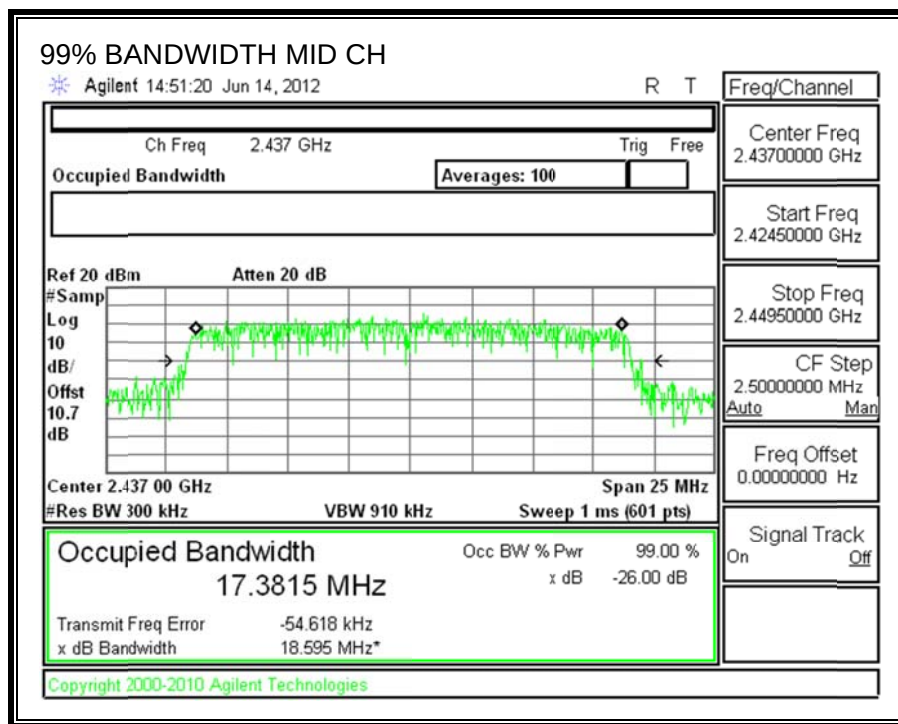
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

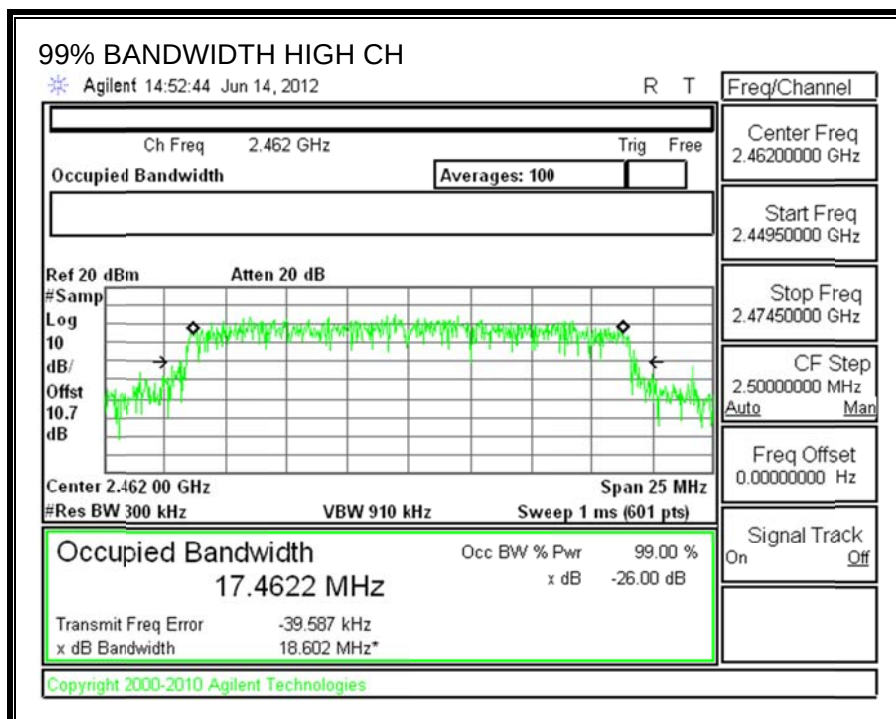
#### RESULTS

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2412               | 17.4728                |
| Middle  | 2437               | 17.3815                |
| High    | 2462               | 17.4622                |

**99% BANDWIDTH**







### 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.

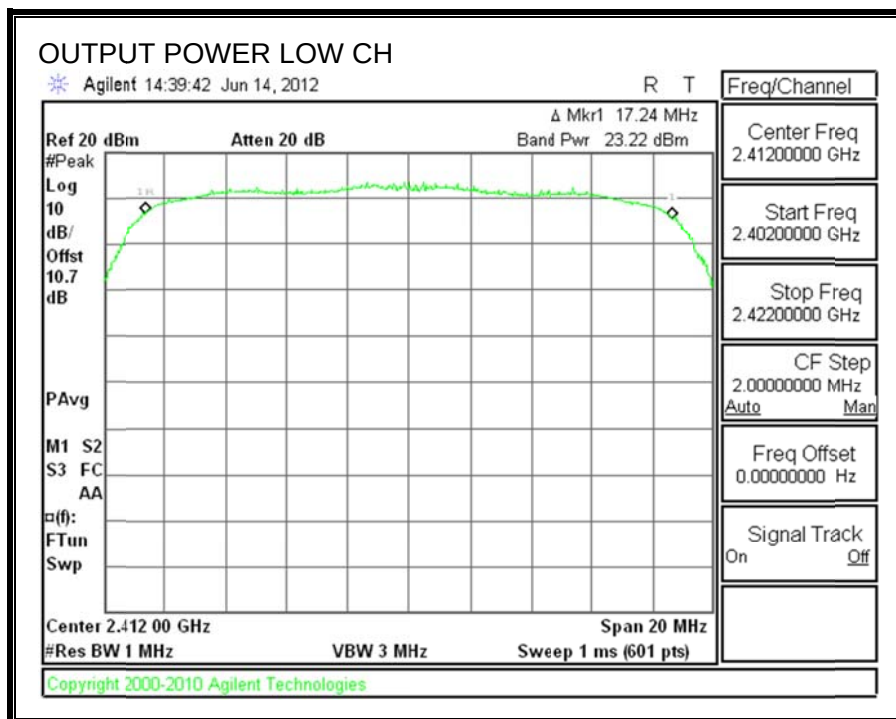
#### TEST PROCEDURE

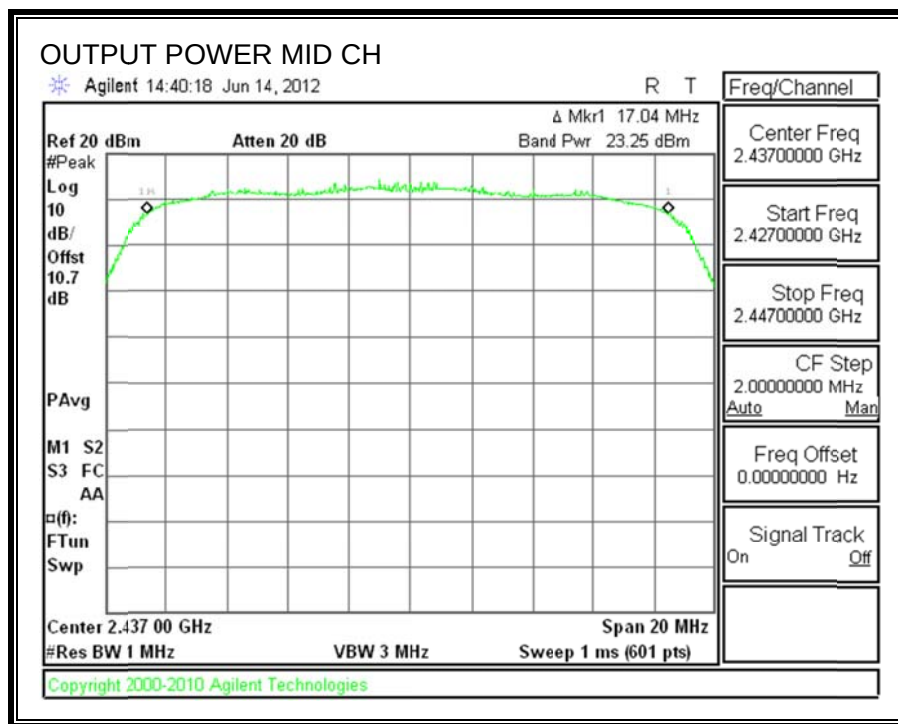
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

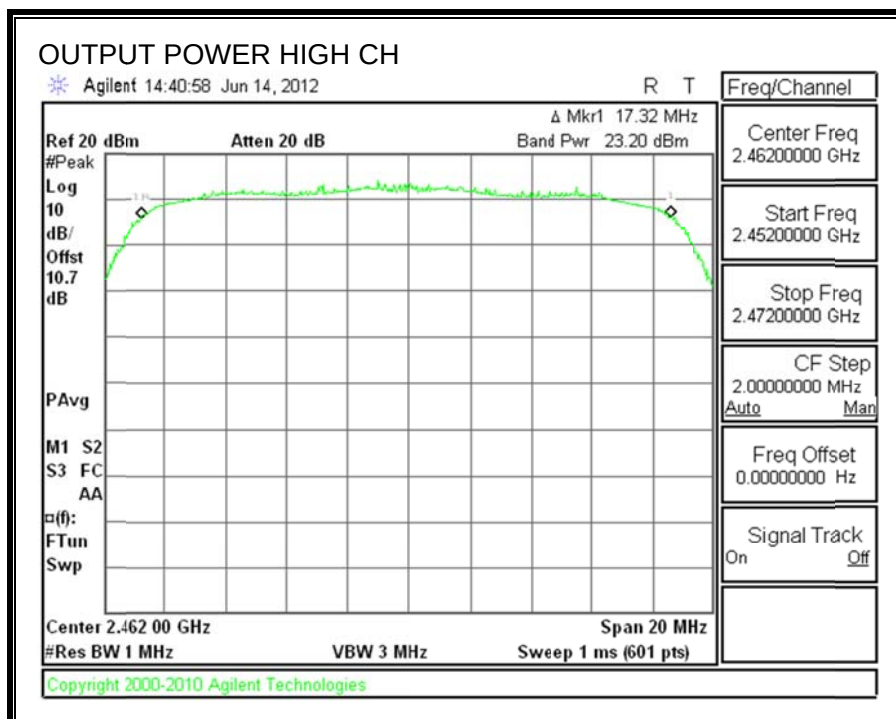
#### RESULTS

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 23.22                          | 30             | -6.78          |
| Middle  | 2437               | 23.25                          | 30             | -6.75          |
| High    | 2462               | 23.20                          | 30             | -6.80          |

## 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 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Power<br>(dBm) |
|---------|--------------------|----------------|
| Low     | 2412               | 14.33          |
| Middle  | 2437               | 14.32          |
| High    | 2462               | 14.27          |

### 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

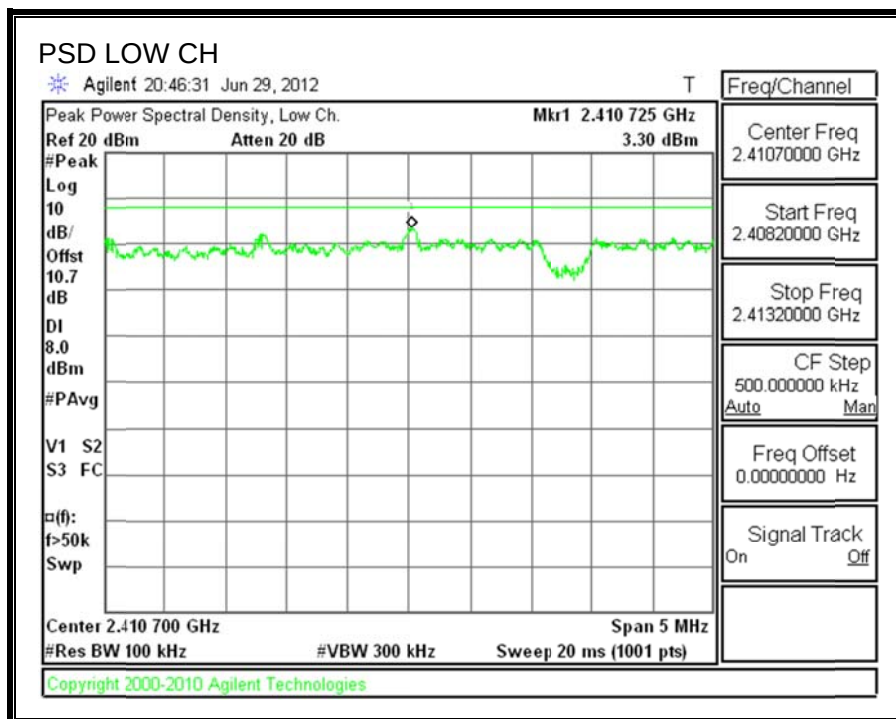
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

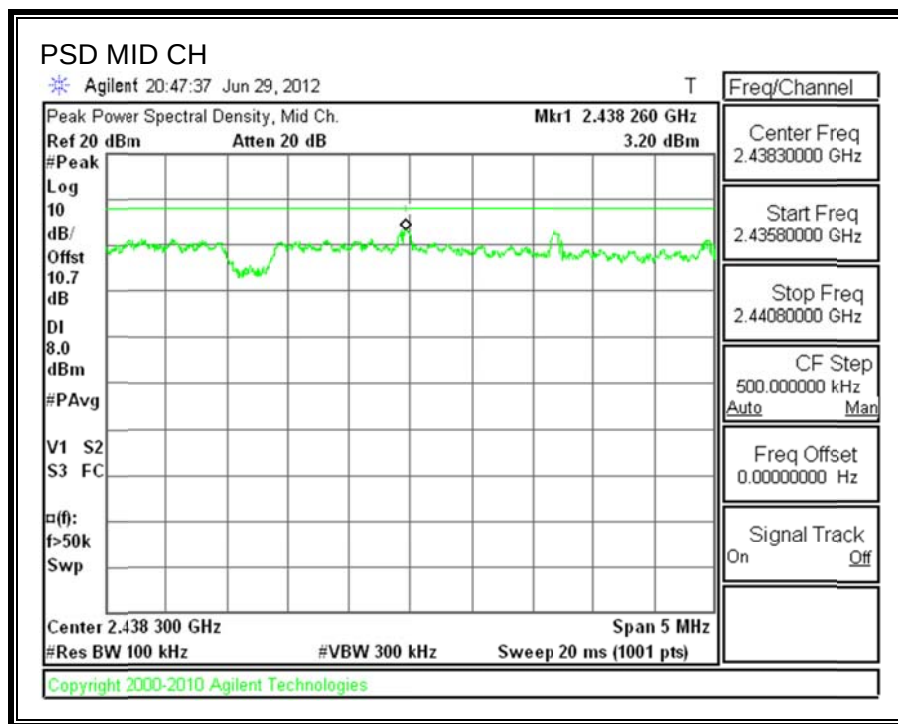
#### RESULTS

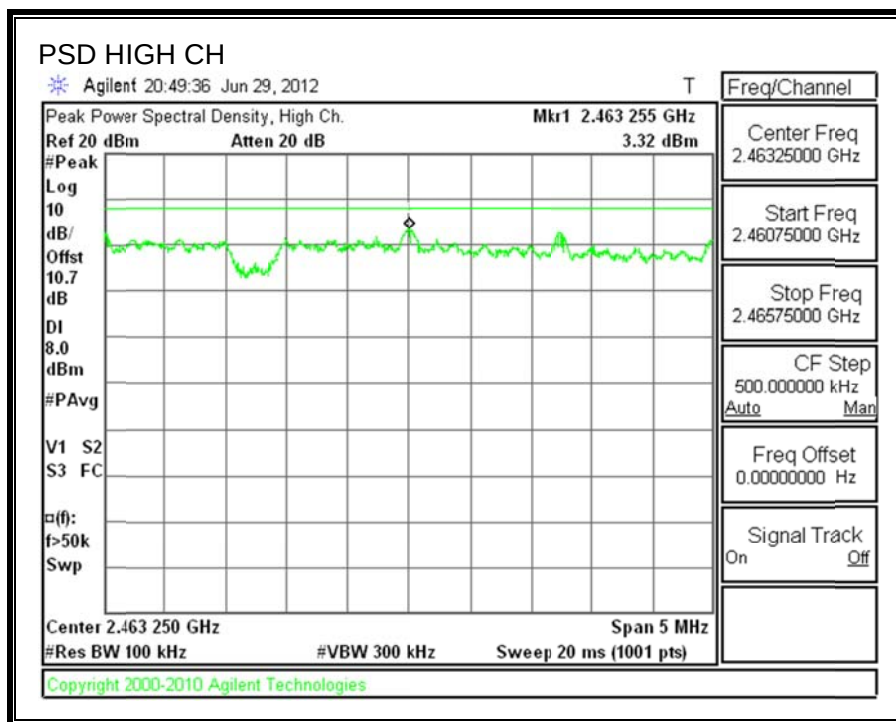
| Channel | Frequency (MHz) | PSD/100kHz (dBm) | PSD/3kHz (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|------------------|----------------|-------------|-------------|
| Low     | 2412            | 3.30             | -11.90         | 8           | -19.90      |
| Middle  | 2437            | 3.20             | -12.00         | 8           | -20.00      |
| High    | 2462            | 3.32             | -11.88         | 8           | -19.88      |

Note: Conversion factor to an equivalent value in 3 kHz for comparison to the limit is;  
 $10\log(3\text{kHz}/100\text{kHz}) = -15.2\text{dB}$

**POWER SPECTRAL DENSITY**







### **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.

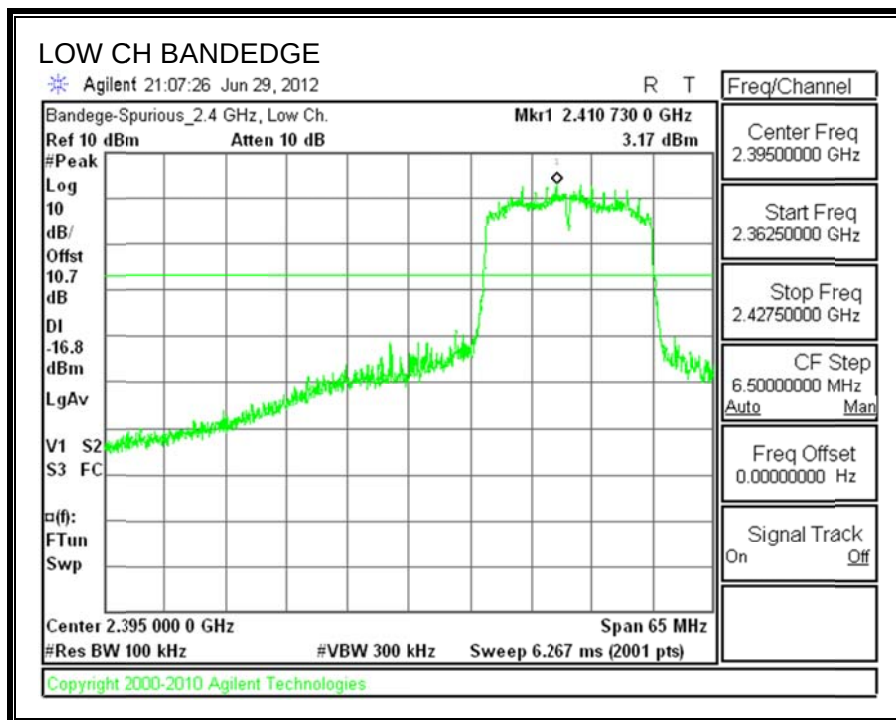
#### **TEST PROCEDURE**

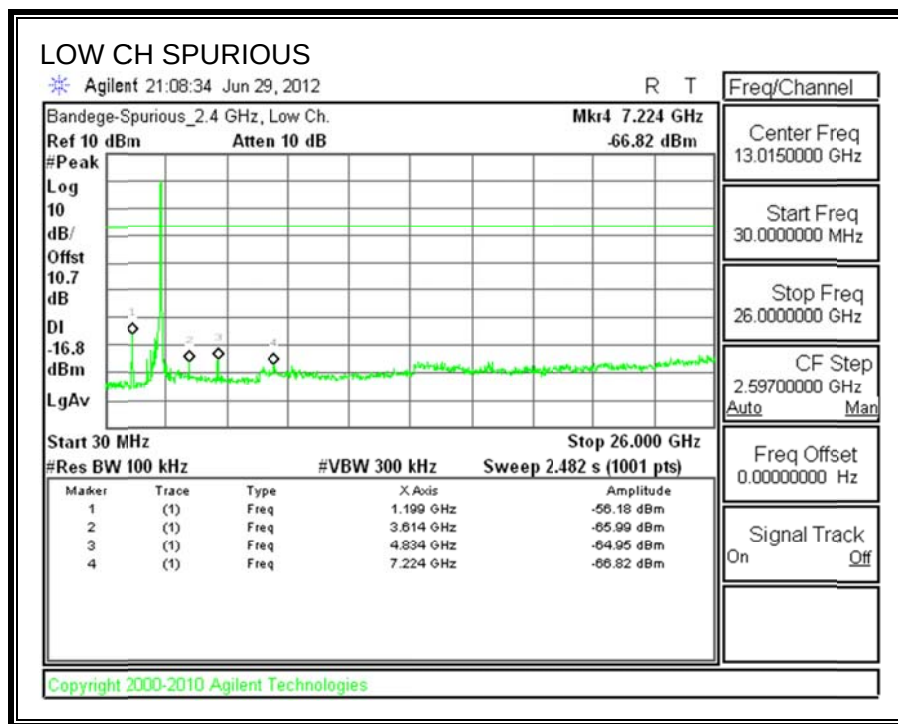
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

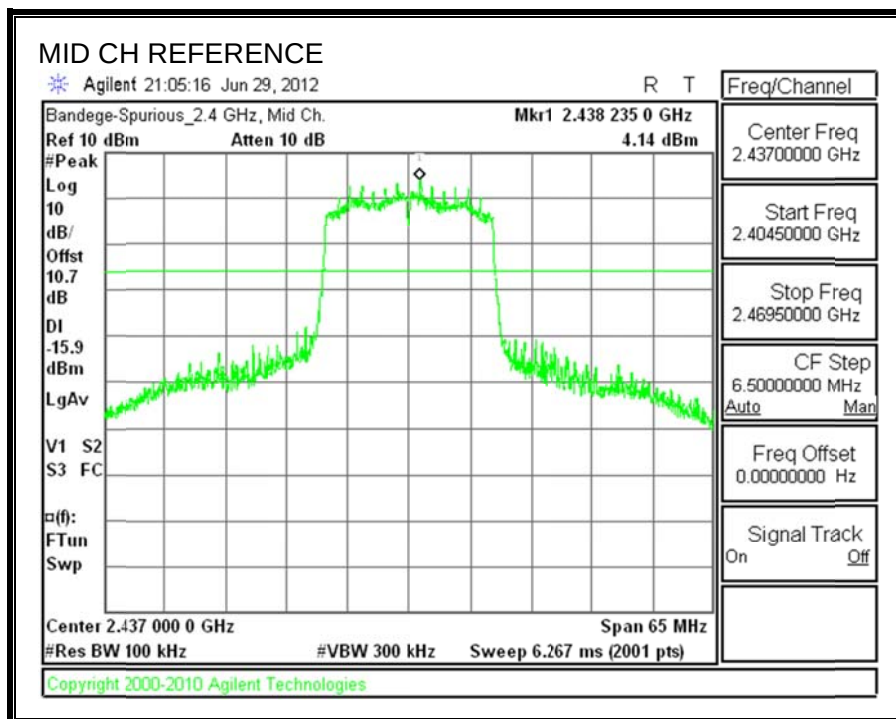
## RESULTS

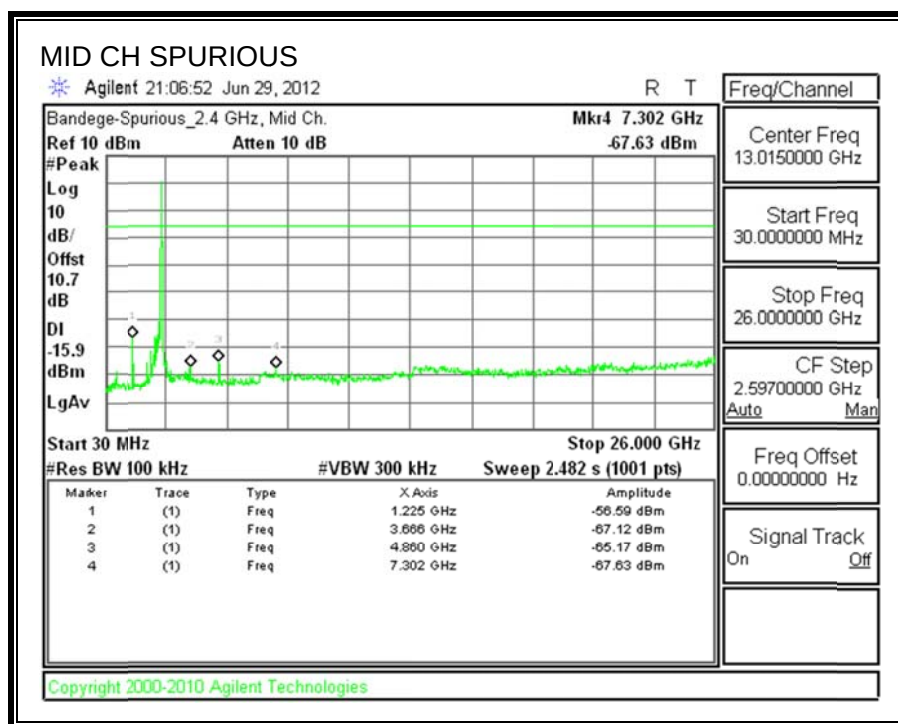
### SPURIOUS EMISSIONS, LOW CHANNEL



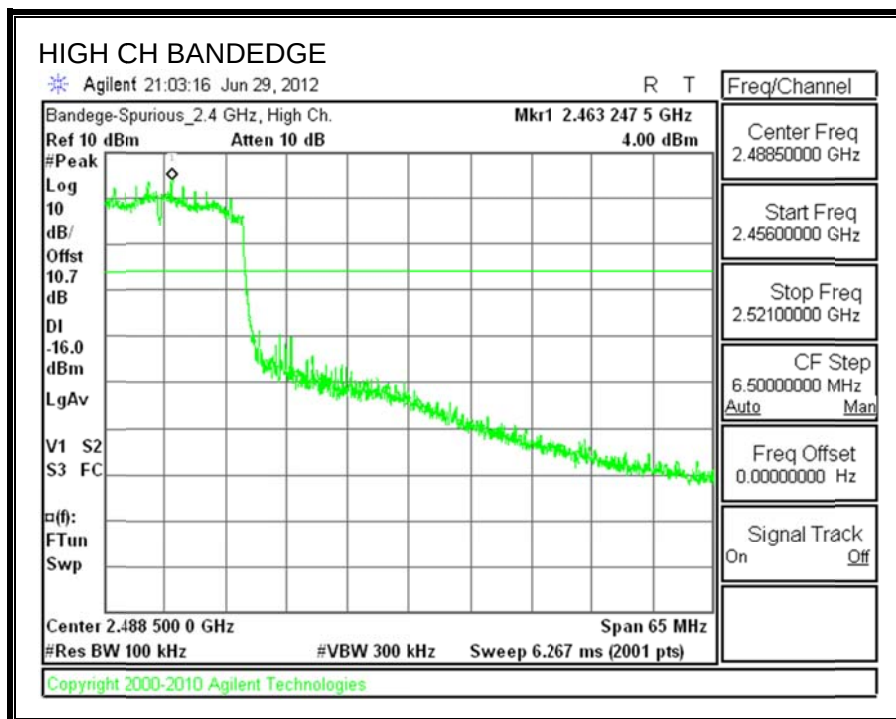


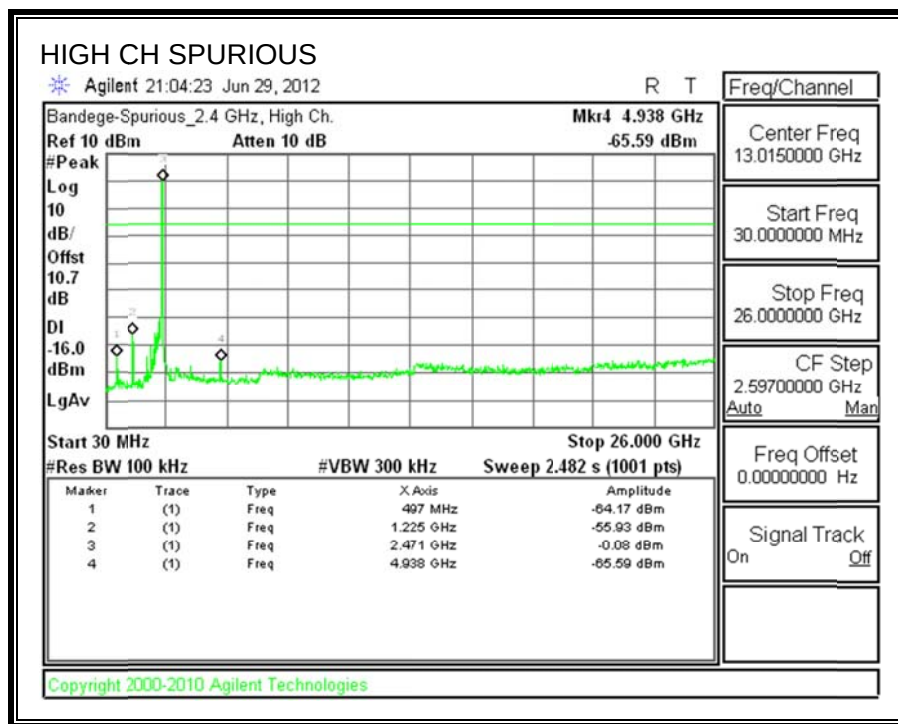
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.5 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

#### TEST PROCEDURE

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

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

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

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

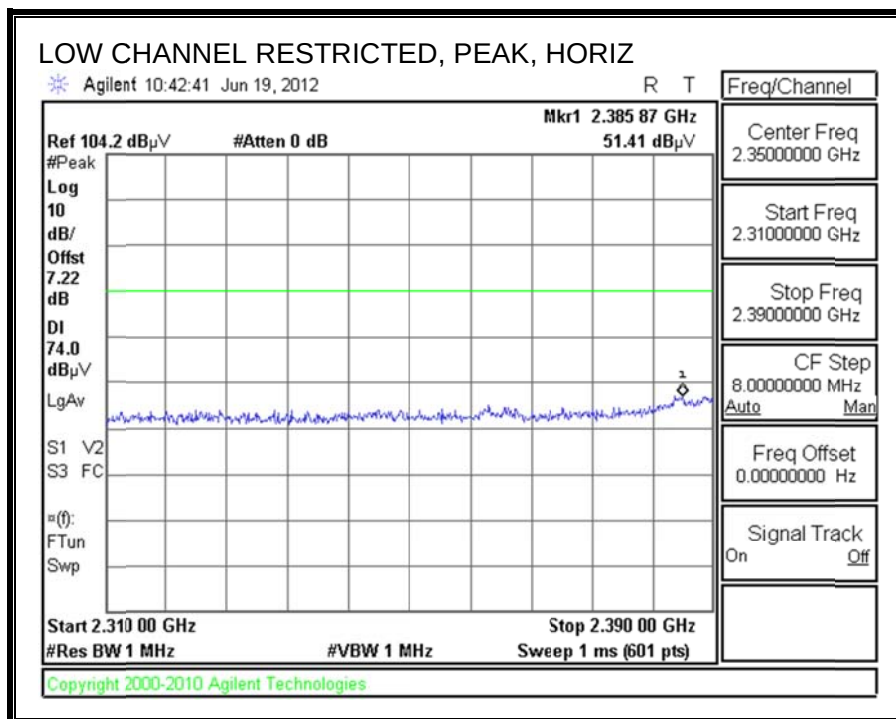
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

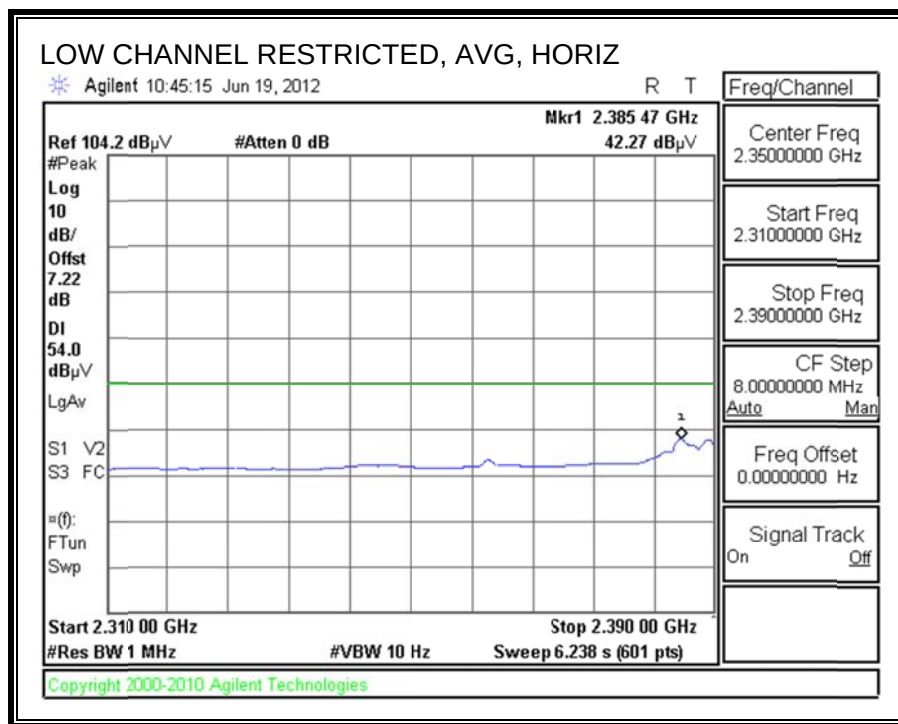
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 8.2. TRANSMITTER ABOVE 1 GHz

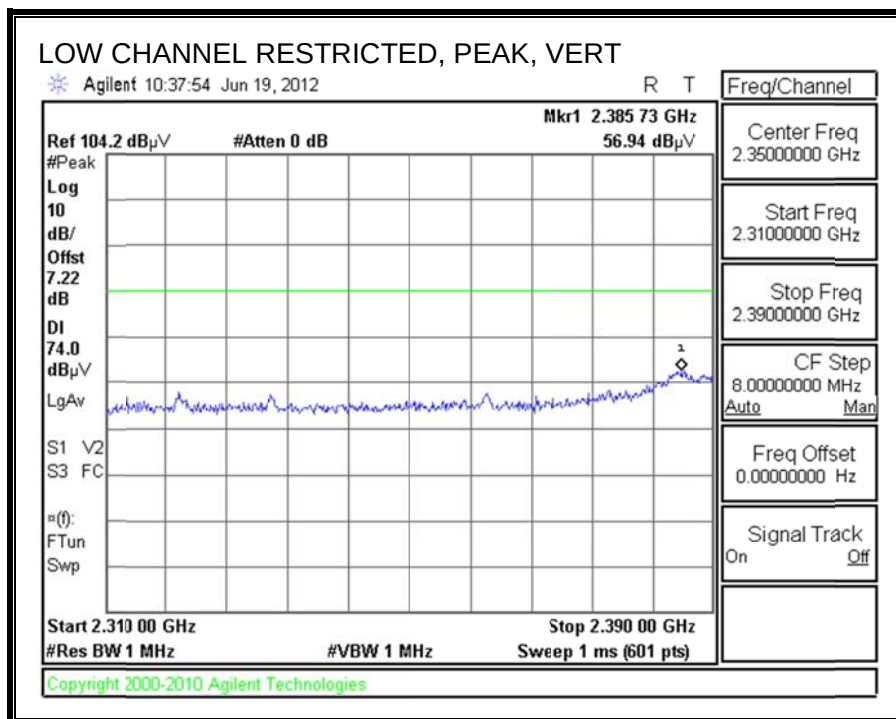
### 8.2.1. TX ABOVE 1 GHz FOR 802.11b 1TX MODE IN THE 2.4 GHz BAND

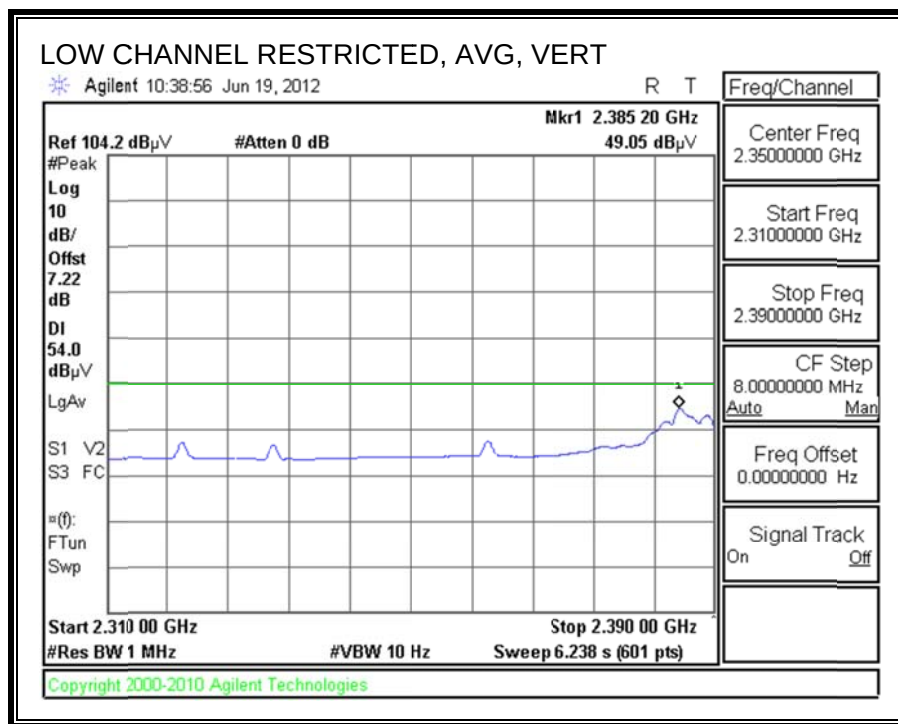
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



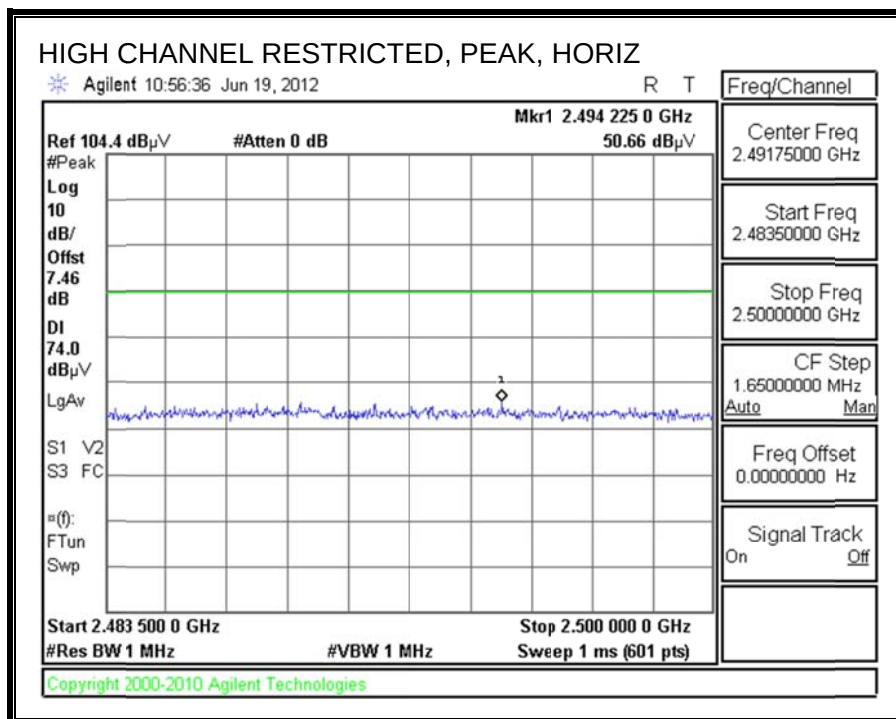


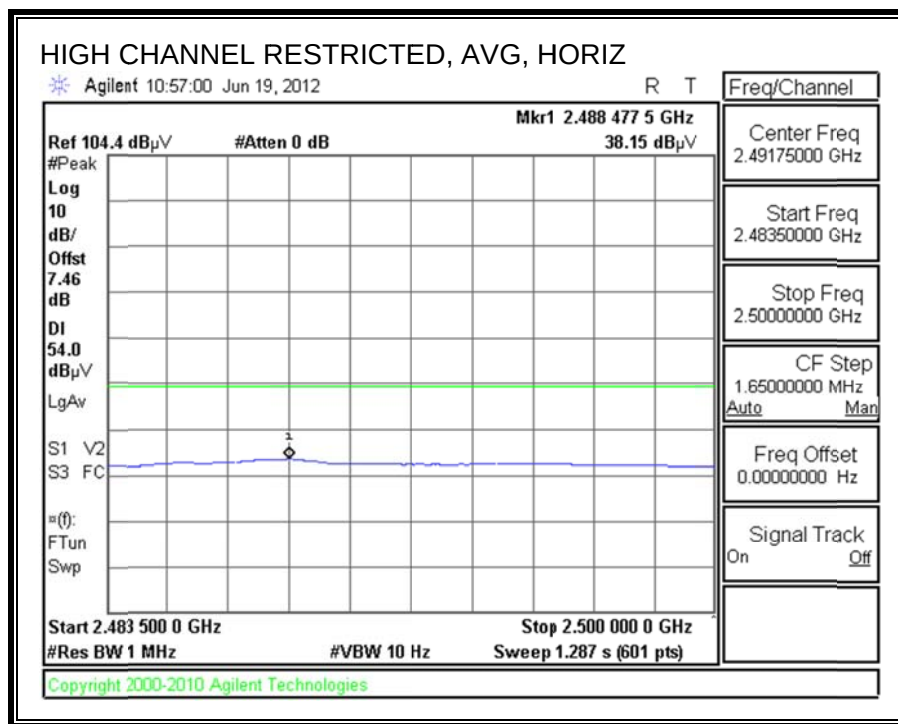
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



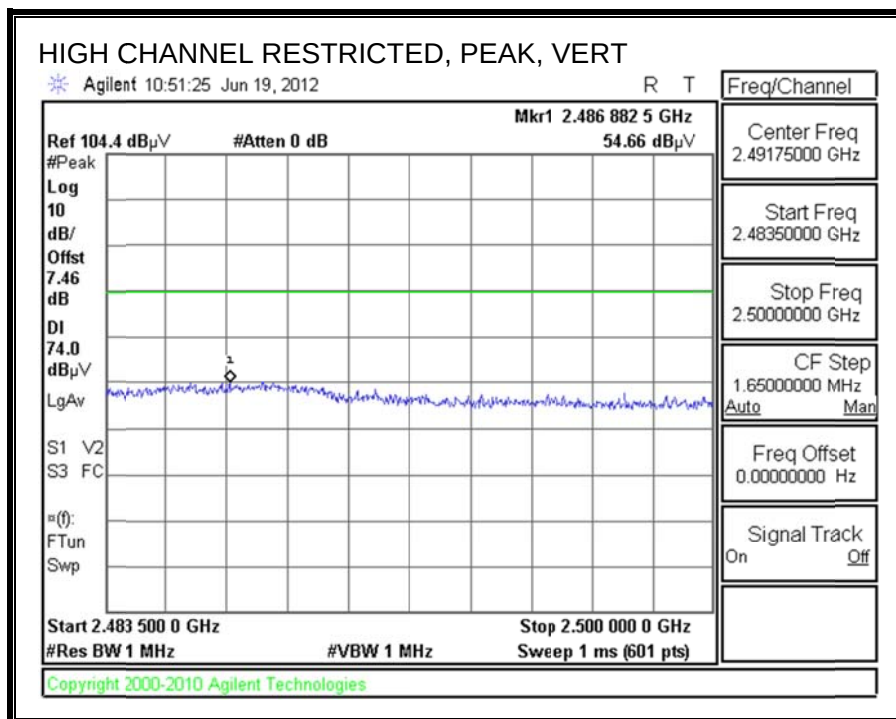


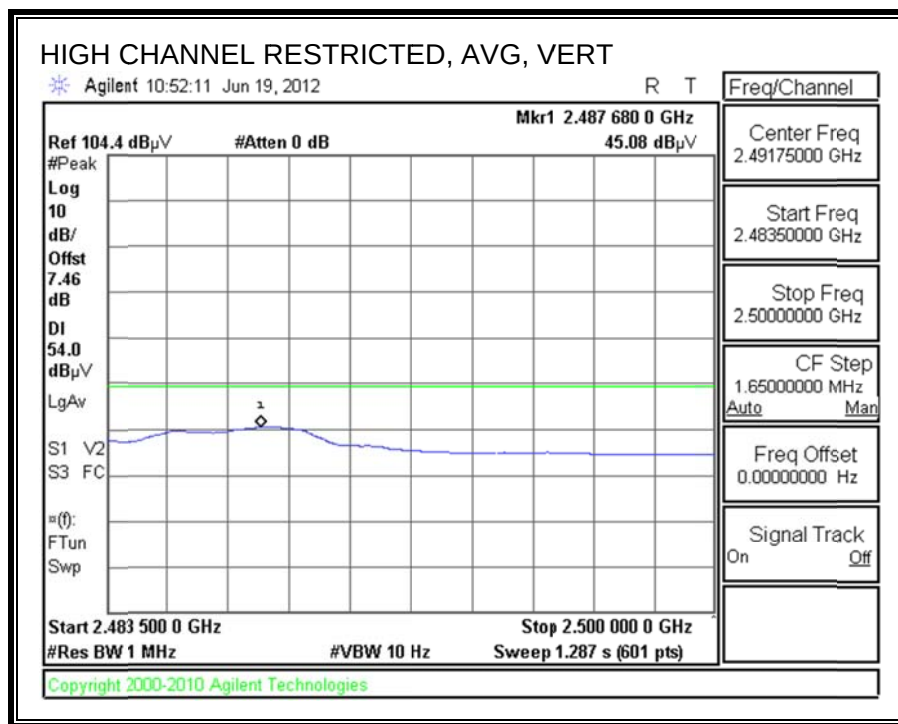
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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



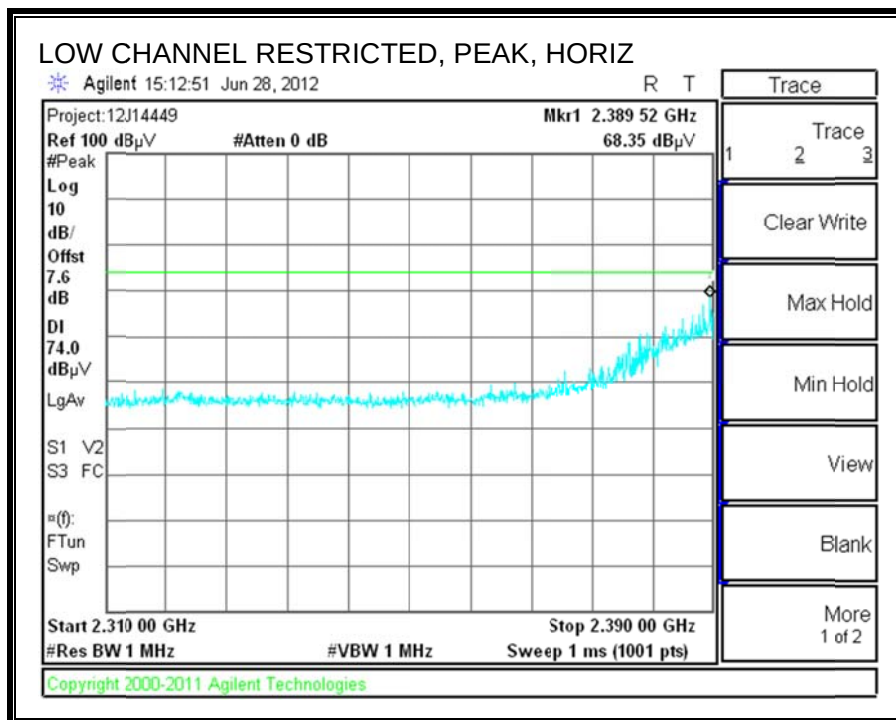


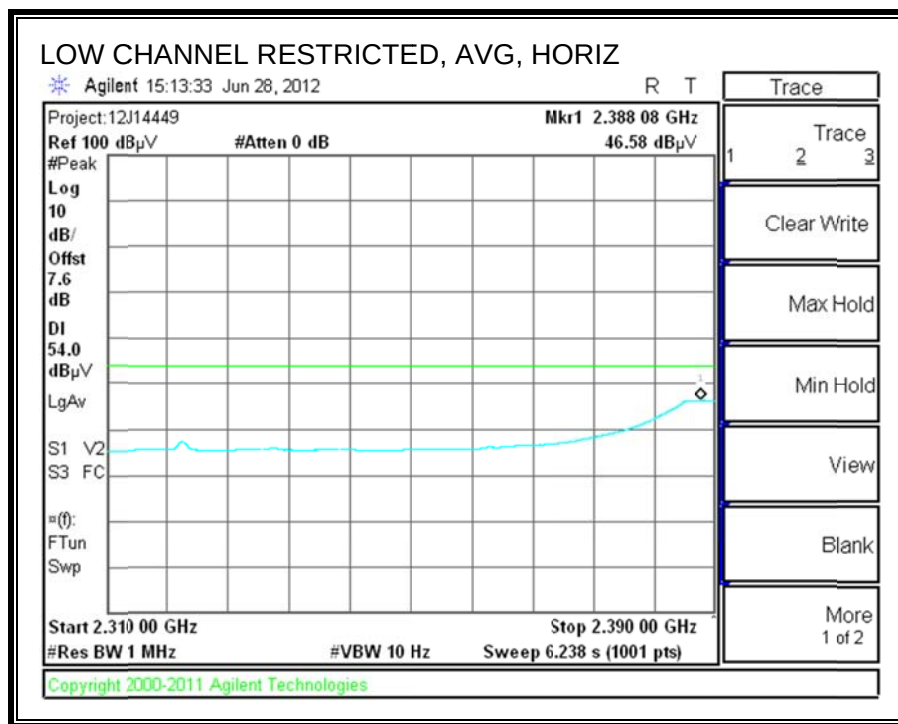
## HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                              |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
|---------------------------------------------------------|-----------------------|---------------------------|-------------------|--------------------------------|----------|------------------------------|------------------------------|---------------|----------------|----------------------------------------------------------------------------------|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Fremont 5m Chamber-B |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Company:                                                |                       | Mitsumi Electronic Co.    |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Project #:                                              |                       | 12J14449                  |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Date:                                                   |                       | 6/27/2012                 |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Test Engineer:                                          |                       | Mengistu Mekuria          |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Configuration:                                          |                       | EUT and Support Equipment |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Mode:                                                   |                       | TX, 802.11b Mode          |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Test Equipment:                                         |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| Horn 1-18GHz                                            |                       | Pre-amplifier 1-26GHz     |                   | Pre-amplifier 26-40GHz         |          | Horn > 18GHz                 |                              | Limit         |                |                                                                                  |                  |                   |              |               |                |
| T59; S/N: 3245 @3m                                      |                       | T145 Agilent 3008A0056    |                   |                                |          | T125; ARA 18-26GHz; S/N:1007 |                              | FCC 15.209    |                |                                                                                  |                  |                   |              |               |                |
| Hi Frequency Cables                                     |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 3' cable 22807700                                       |                       | 12' cable 22807600        |                   | 20' cable 22807500             |          | HPF                          |                              | Reject Filter |                | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |                  |                   |              |               |                |
| 3' cable 22807700                                       |                       | 12' cable 22807600        |                   | 20' cable 22807500             |          |                              |                              | 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                 | Fltr<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 (2412MHz)                                   |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 4.824                                                   | 3.0                   | 45.7                      | 41.6              | 33.1                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 50.3           | 46.1                                                                             | 74               | 54                | -23.7        | -7.9          | V              |
| 4.824                                                   | 3.0                   | 45.3                      | 41.2              | 33.1                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 49.8           | 45.7                                                                             | 74               | 54                | -24.2        | -8.3          | E              |
| Mid Channel (2437 MHz)                                  |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 4.874                                                   | 3.0                   | 44.3                      | 40.2              | 33.1                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 48.9           | 44.9                                                                             | 74               | 54                | -25.1        | -9.1          | V              |
| 7.311                                                   | 3.0                   | 40.5                      | 32.7              | 35.8                           | 8.5      | -34.9                        | 0.0                          | 0.0           | 49.9           | 42.1                                                                             | 74               | 54                | -24.1        | -11.9         | V              |
| 4.874                                                   | 3.0                   | 42.8                      | 37.5              | 33.1                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 47.4           | 42.1                                                                             | 74               | 54                | -26.6        | -11.9         | E              |
| 7.311                                                   | 3.0                   | 39.2                      | 29.8              | 35.8                           | 8.5      | -34.9                        | 0.0                          | 0.0           | 48.6           | 39.2                                                                             | 74               | 54                | -25.4        | -14.8         | E              |
| Hi Channel (2462 MHz)                                   |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 4.924                                                   | 3.0                   | 43.8                      | 38.9              | 33.2                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 48.5           | 43.6                                                                             | 74               | 54                | -25.5        | -10.4         | V              |
| 7.386                                                   | 3.0                   | 40.4                      | 28.9              | 35.9                           | 8.5      | -34.9                        | 0.0                          | 0.0           | 49.9           | 38.4                                                                             | 74               | 54                | -24.1        | -15.6         | V              |
| 4.924                                                   | 3.0                   | 42.6                      | 36.9              | 33.2                           | 6.3      | -34.8                        | 0.0                          | 0.0           | 47.3           | 41.6                                                                             | 74               | 54                | -26.7        | -12.4         | E              |
| 7.386                                                   | 3.0                   | 39.9                      | 27.1              | 35.9                           | 8.5      | -34.9                        | 0.0                          | 0.0           | 49.4           | 36.7                                                                             | 74               | 54                | -24.6        | -17.3         | E              |
| Rev. 11.10.11                                           |                       |                           |                   |                                |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |
| 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               |          |                              |                              |               |                |                                                                                  |                  |                   |              |               |                |

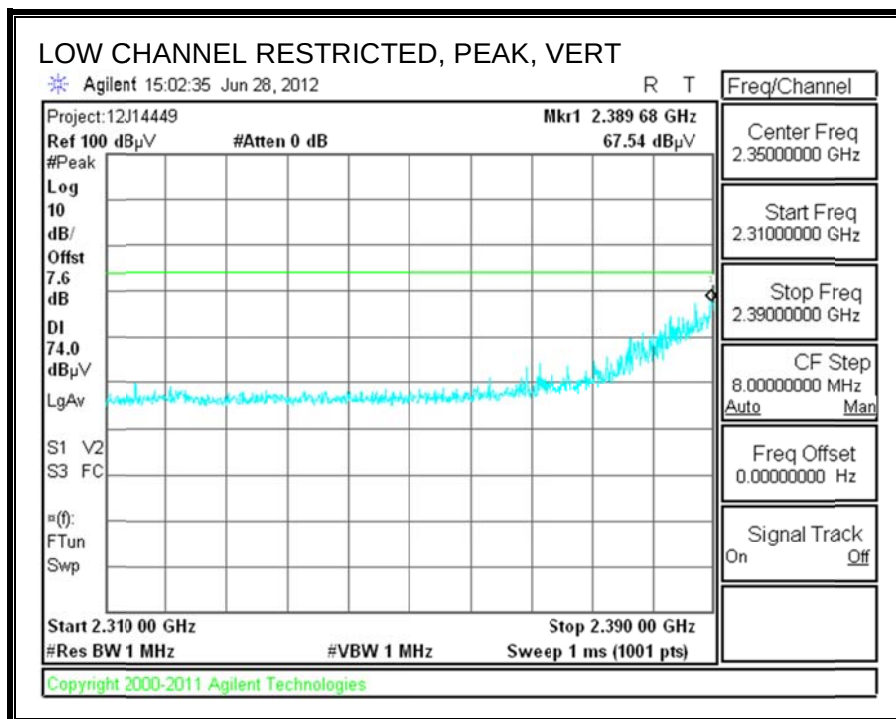
## 8.2.2. TX ABOVE 1 GHz FOR 802.11g 1TX MODE IN THE 2.4 GHz BAND

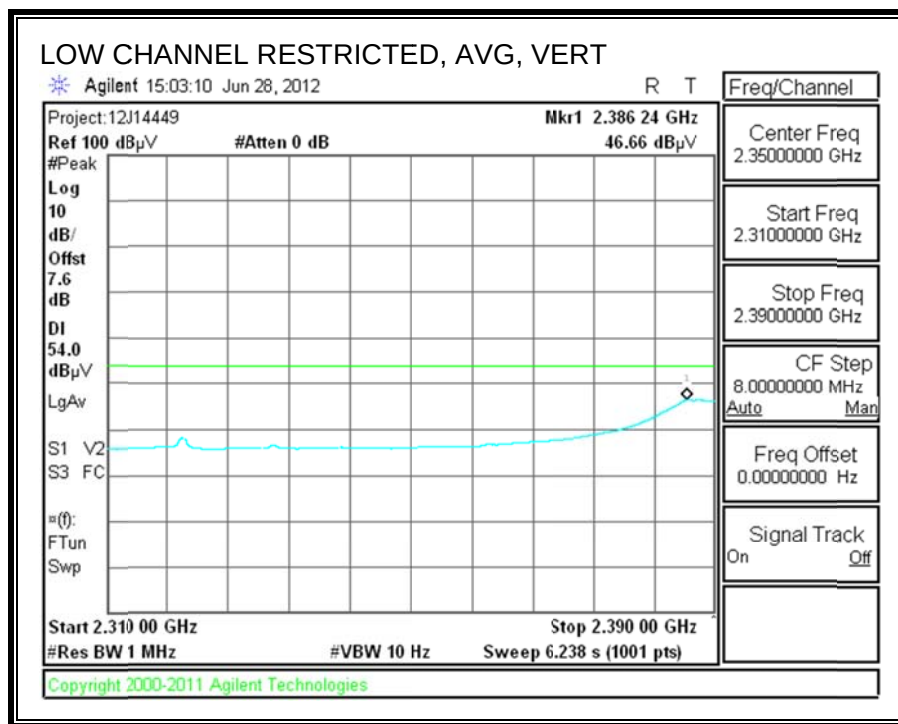
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



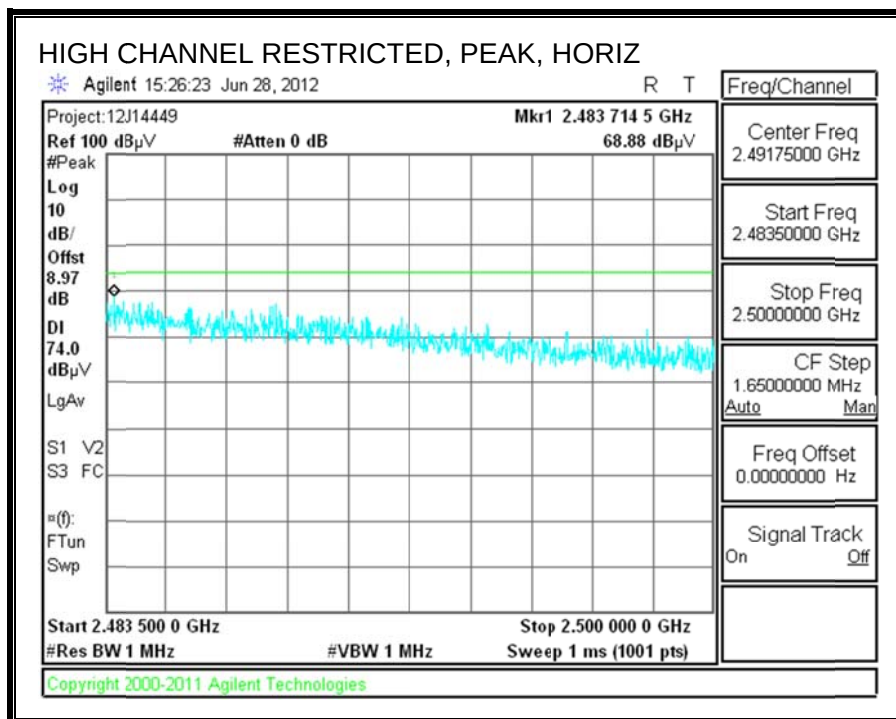


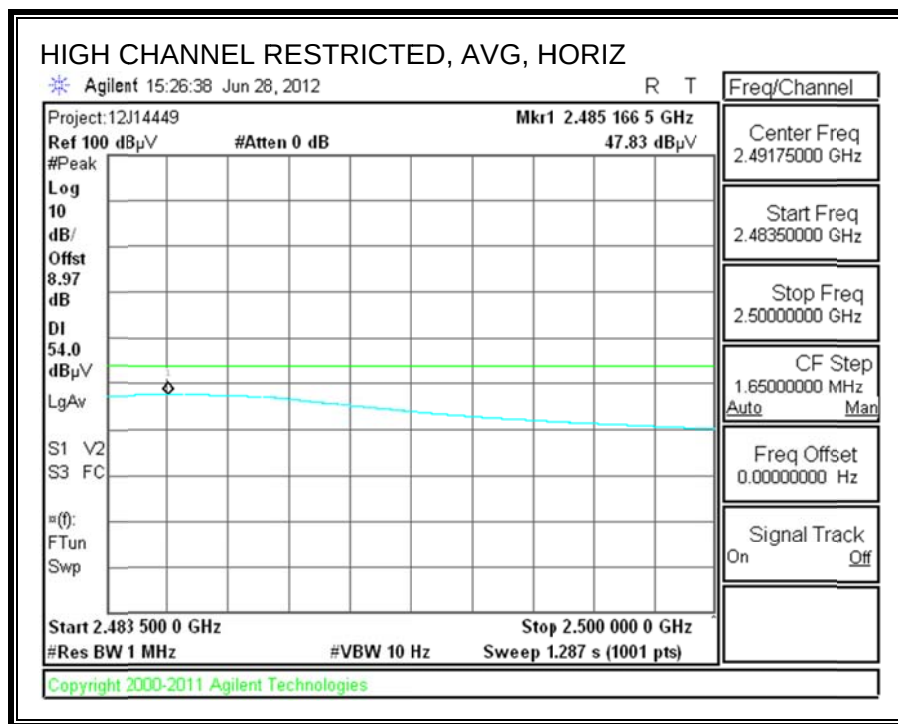
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



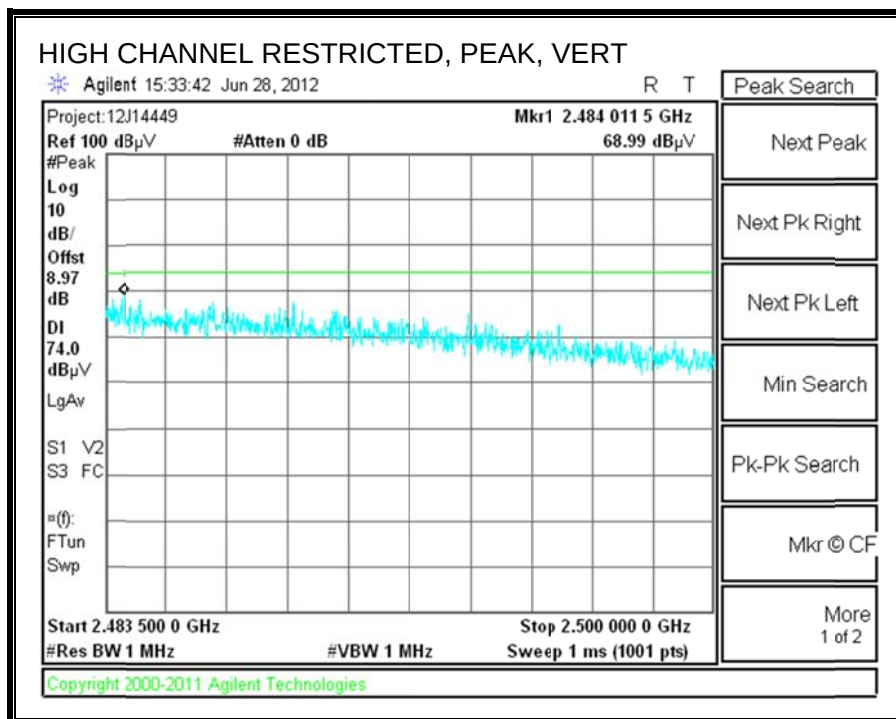


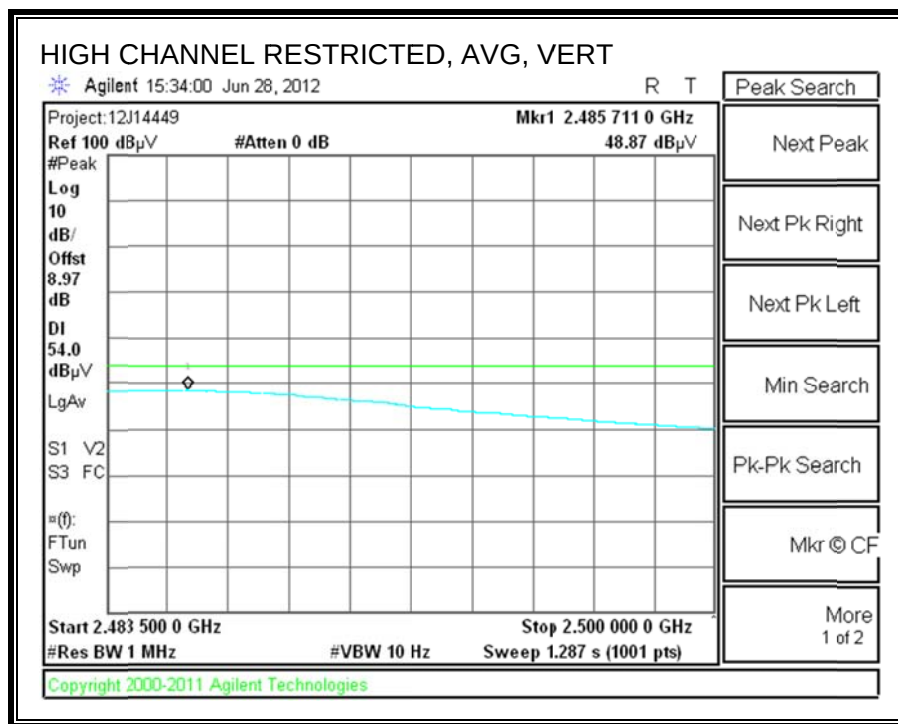
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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



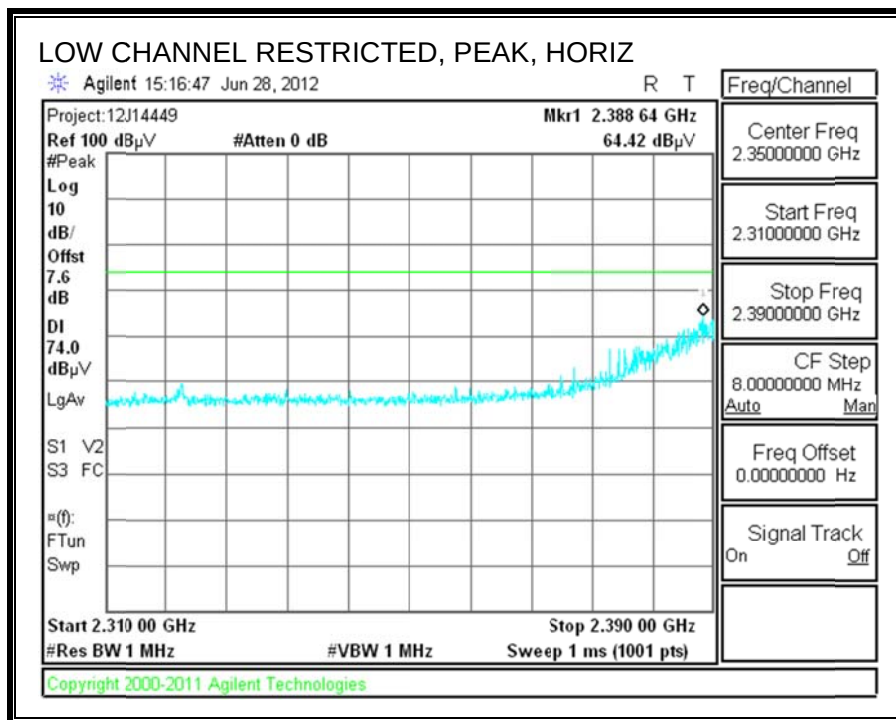


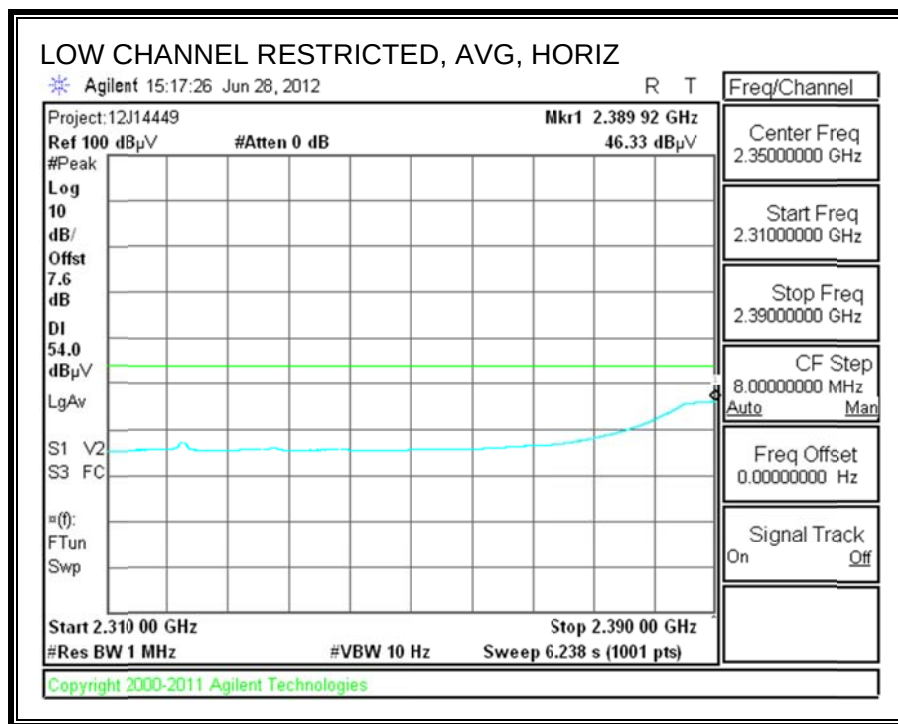
## HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement                                                                                                       |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------|------------------------|------|-----|------------------------|--------------------------------|------|------------------------------|--------|--------|---------------|------------------------------|---------|-------|
| Compliance Certification Services, Fremont 5m Chamber-B                                                                          |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Company:                                                                                                                         |                       | Mitsumi Electronic Co.    |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Project #:                                                                                                                       |                       | 12J14449                  |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Date:                                                                                                                            |                       | 6/27/2012                 |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Test Engineer:                                                                                                                   |                       | Mengistu Mekuria          |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Configuration:                                                                                                                   |                       | EUT and Support Equipment |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Mode:                                                                                                                            |                       | TX, 802.11g Mode          |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Test Equipment:                                                                                                                  |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| Horn 1-18GHz                                                                                                                     |                       |                           | Pre-amplifier 1-26GHz  |      |     | Pre-amplifier 26-40GHz |                                |      | Horn > 18GHz                 |        |        | Limit         |                              |         |       |
| T59; S/N: 3245 @3m                                                                                                               |                       |                           | T145 Agilent 3008A0056 |      |     |                        |                                |      | T125; ARA 18-26GHz; S/N:1007 |        |        | FCC 15.205    |                              |         |       |
| Hi Frequency Cables                                                                                                              |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| 3' cable 22807700                                                                                                                |                       |                           | 12' cable 22807600     |      |     | 20' cable 22807500     |                                |      | HPF                          |        |        | Reject Filter |                              |         |       |
| 3' cable 22807700                                                                                                                |                       |                           | 12' cable 22807600     |      |     | 20' cable 22807500     |                                |      |                              |        |        | R_001         |                              |         |       |
| <div> <div>Peak Measurements</div> <div>RBW=VBW=1MHz</div> <div>Average Measurements</div> <div>RBW=1MHz ; VBW=10Hz</div> </div> |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| f                                                                                                                                | Dist                  | Read Pk                   | Read Avg.              | AF   | CL  | Amp                    | D Corr                         | Fltr | 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) |
| Low Channel (2412MHz)                                                                                                            |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| 4.824                                                                                                                            | 3.0                   | 45.3                      | 30.5                   | 33.1 | 6.3 | -34.8                  | 0.0                            | 0.0  | 49.9                         | 35.1   | 74     | 54            | -24.1                        | -18.9   | V     |
| 4.824                                                                                                                            | 3.0                   | 44.1                      | 30.4                   | 33.1 | 6.3 | -34.8                  | 0.0                            | 0.0  | 48.7                         | 34.9   | 74     | 54            | -25.3                        | -19.1   | H     |
| Mid Channel (2437 MHz)                                                                                                           |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| 4.874                                                                                                                            | 3.0                   | 45.7                      | 29.7                   | 33.1 | 6.3 | -34.8                  | 0.0                            | 0.0  | 50.3                         | 34.4   | 74     | 54            | -23.7                        | -19.6   | V     |
| 7.311                                                                                                                            | 3.0                   | 46.7                      | 29.8                   | 35.8 | 8.5 | -34.9                  | 0.0                            | 0.0  | 56.1                         | 39.2   | 74     | 54            | -17.9                        | -14.8   | V     |
| 4.874                                                                                                                            | 3.0                   | 44.2                      | 28.2                   | 33.1 | 6.3 | -34.8                  | 0.0                            | 0.0  | 48.8                         | 32.9   | 74     | 54            | -25.2                        | -21.1   | H     |
| 7.311                                                                                                                            | 3.0                   | 43.6                      | 27.6                   | 35.8 | 8.5 | -34.9                  | 0.0                            | 0.0  | 53.0                         | 37.0   | 74     | 54            | -21.0                        | -17.0   | H     |
| Hi Channel (2462 MHz)                                                                                                            |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| 4.924                                                                                                                            | 3.0                   | 44.0                      | 28.5                   | 33.2 | 6.3 | -34.8                  | 0.0                            | 0.0  | 48.7                         | 33.2   | 74     | 54            | -25.3                        | -20.8   | V     |
| 7.386                                                                                                                            | 3.0                   | 41.0                      | 26.6                   | 35.9 | 8.5 | -34.9                  | 0.0                            | 0.0  | 50.6                         | 36.1   | 74     | 54            | -23.4                        | -17.9   | V     |
| 4.924                                                                                                                            | 3.0                   | 42.3                      | 27.5                   | 33.2 | 6.3 | -34.8                  | 0.0                            | 0.0  | 47.0                         | 32.2   | 74     | 54            | -27.0                        | -21.8   | H     |
| 7.386                                                                                                                            | 3.0                   | 39.3                      | 24.8                   | 35.9 | 8.5 | -34.9                  | 0.0                            | 0.0  | 48.8                         | 34.4   | 74     | 54            | -25.2                        | -19.6   | H     |
| Rev. 11.10.11                                                                                                                    |                       |                           |                        |      |     |                        |                                |      |                              |        |        |               |                              |         |       |
| 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               |      |                              |        |        |               |                              |         |       |

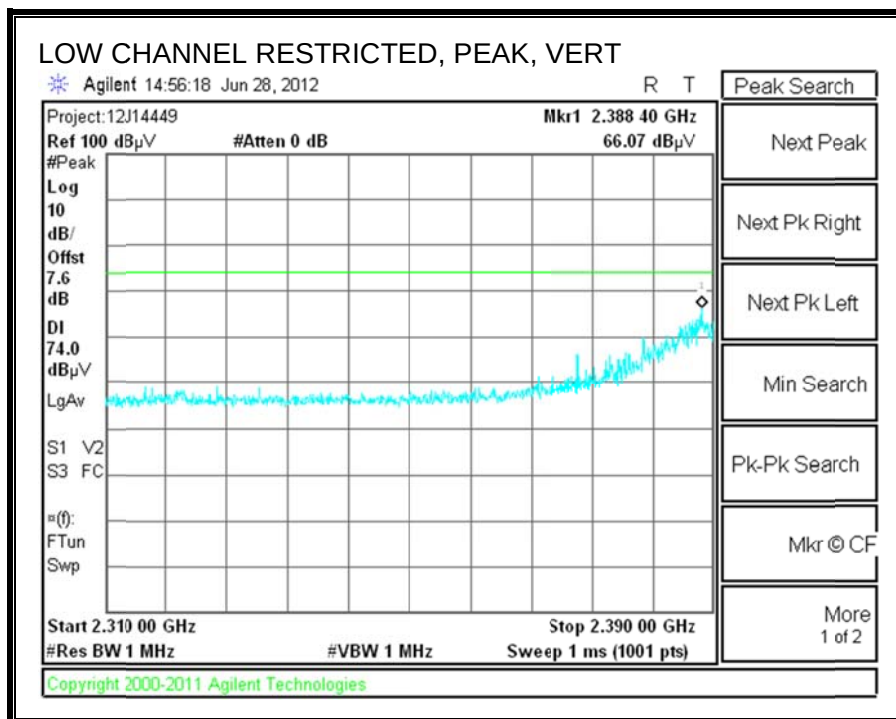
### 8.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 1TX MODE IN THE 2.4 GHz BAND

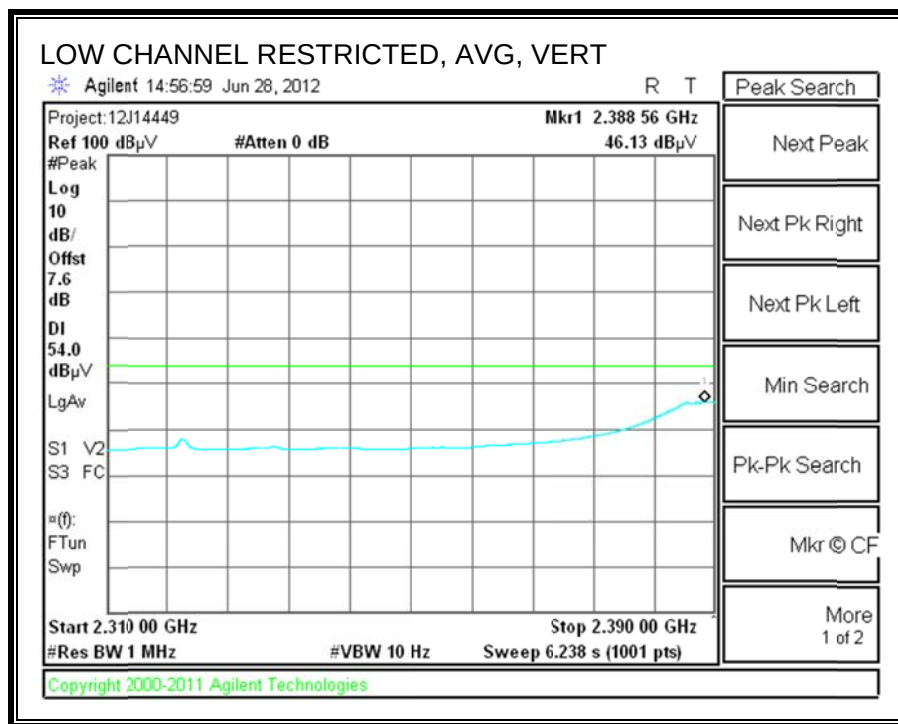
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



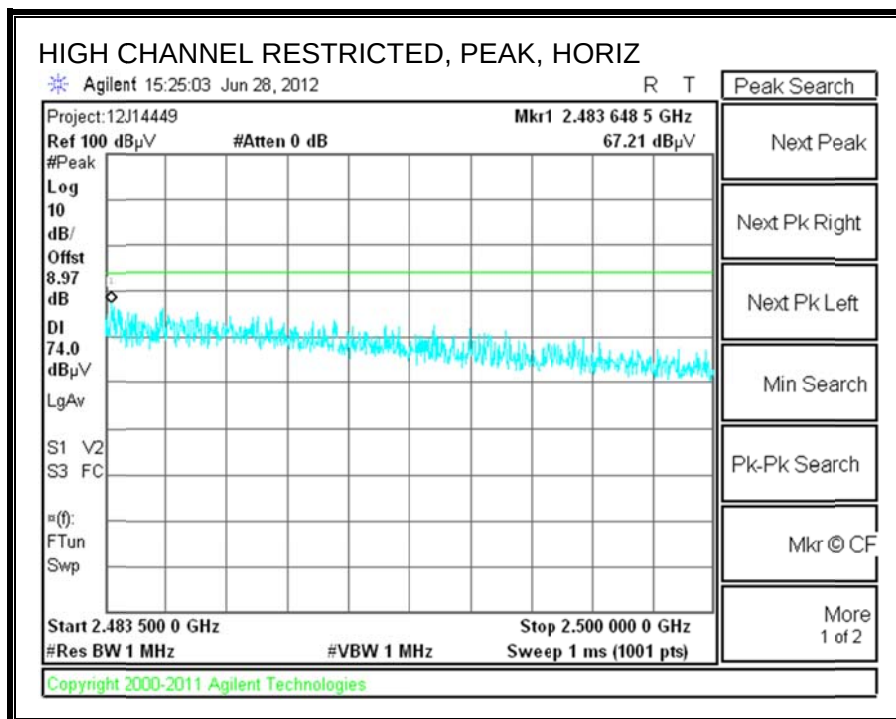


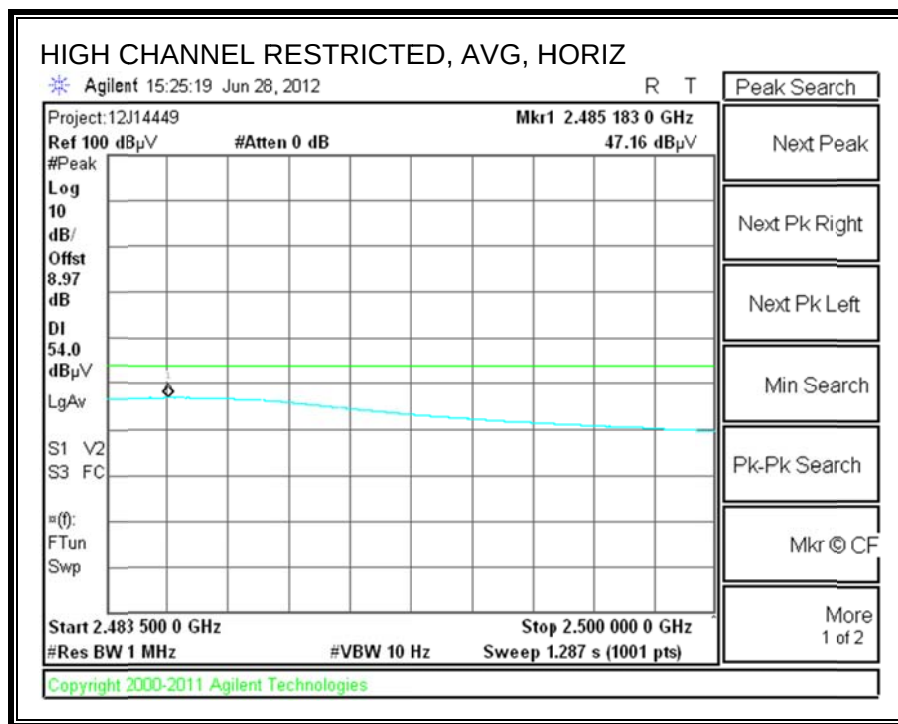
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



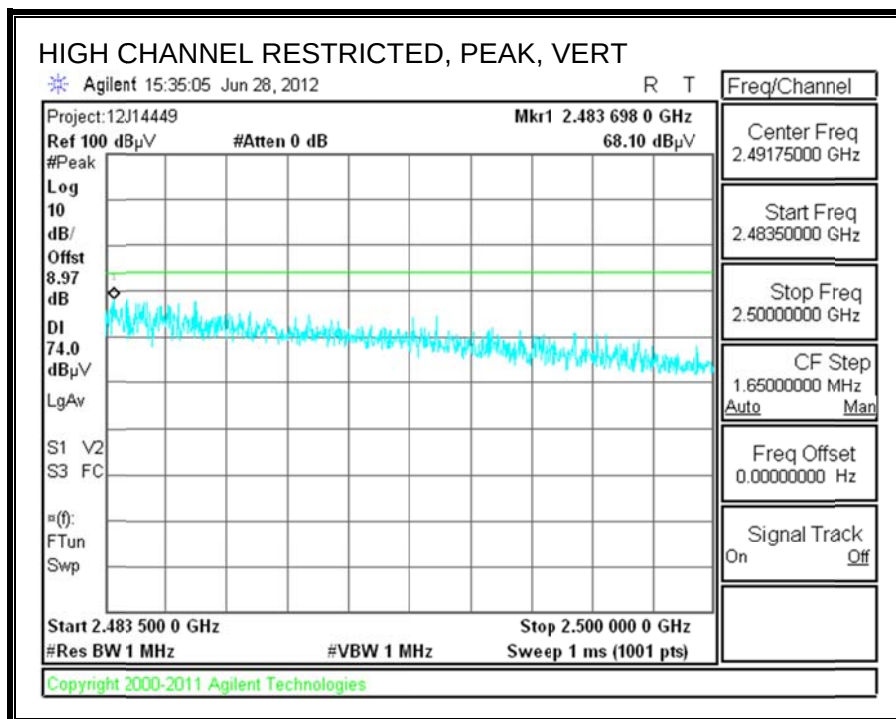


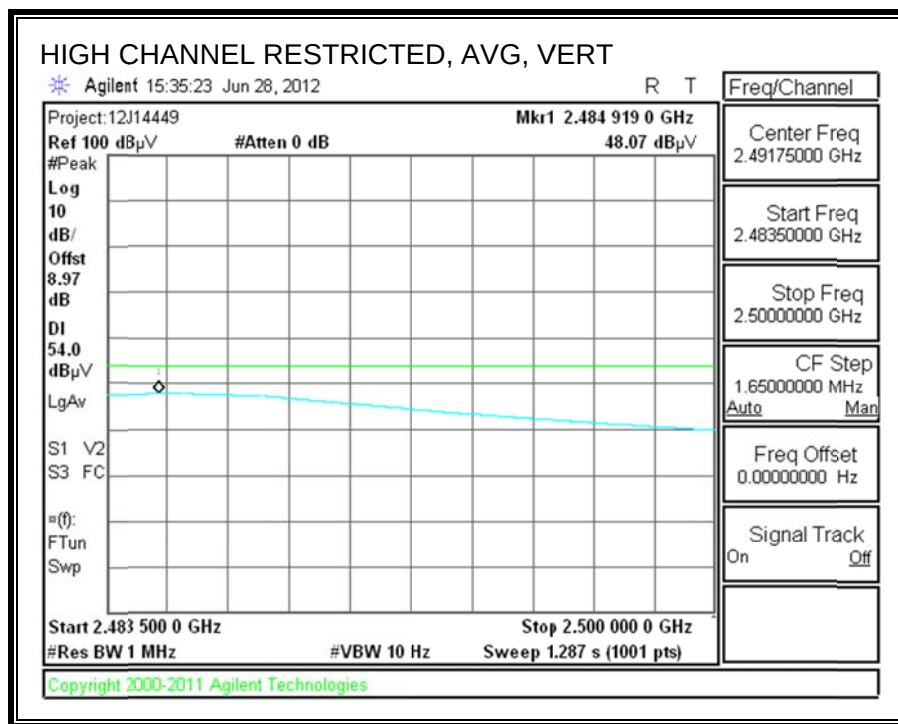
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





## HARMONICS AND SPURIOUS EMISSIONS

|                                                 |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
|-------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------|--------------------------|--------------------------------|-----------------|------------------|------------------------------|-------------------|-----------------------|----------------------|-------------------------|--------------------------|---------------------|----------------------|-----------------------|
| <b>Test Engineer:</b> Mengistu Mekuria          |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Configuration:</b> EUT and Support Equipment |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Mode:</b> TX, 902.11n Mode                   |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Test Equipment:</b>                          |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Horn 1-18GHz</b><br>T59; S/N: 3245 @3m       | <b>Pre-amplifier 1-26GHz</b><br>T145 Agilent 3008A0056                                         |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Pre-amplifier 26-40GHz</b>                   | <b>Horn &gt; 18GHz</b><br>T125; ARA 18-26GHz; S/N:1007                                         |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Limit</b><br>FCC 15.245                      |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Hi Frequency Cables</b>                      |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>3' cable 22807700</b><br>3' cable 22807700   | <b>12' cable 22807600</b><br>12' cable 22807600                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>20' cable 22807500</b><br>20' cable 22807500 | <b>HPF</b>                                                                                     |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>Reject Filter</b><br>R_001                   | <b>Peak Measurements</b><br>RBW=VBW=1MHz<br><b>Average Measurements</b><br>RBW=1MHz ; VBW=10Hz |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| <b>f</b><br>GHz                                 | <b>Dist</b><br>(m)                                                                             | <b>Read Pk</b><br>dBuV | <b>Read Avg.</b><br>dBuV | <b>AF</b><br>dB/m              | <b>CL</b><br>dB | <b>Amp</b><br>dB | <b>D Corr</b><br>dB          | <b>Fltr</b><br>dB | <b>Peak</b><br>dBuV/m | <b>Avg</b><br>dBuV/m | <b>Pk Lim</b><br>dBuV/m | <b>Avg Lim</b><br>dBuV/m | <b>Pk Mar</b><br>dB | <b>Avg Mar</b><br>dB | <b>Notes</b><br>(V/H) |
| <b>Low Channel (2412MHz)</b>                    |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| 4.824                                           | 3.0                                                                                            | 44.5                   | 29.4                     | 33.1                           | 6.3             | -34.8            | 0.0                          | 0.0               | 49.1                  | 34.0                 | 74                      | 54                       | -24.9               | -20.0                | V                     |
| 4.824                                           | 3.0                                                                                            | 42.9                   | 29.3                     | 33.1                           | 6.3             | -34.8            | 0.0                          | 0.0               | 47.4                  | 33.9                 | 74                      | 54                       | -26.6               | -20.1                | H                     |
| <b>Mid Channel (2437 MHz)</b>                   |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| 4.874                                           | 3.0                                                                                            | 45.7                   | 28.7                     | 33.1                           | 6.3             | -34.8            | 0.0                          | 0.0               | 50.3                  | 33.3                 | 74                      | 54                       | -23.7               | -20.7                | V                     |
| 7.311                                           | 3.0                                                                                            | 45.4                   | 28.6                     | 35.8                           | 8.5             | -34.9            | 0.0                          | 0.0               | 54.8                  | 38.0                 | 74                      | 54                       | -19.2               | -16.0                | V                     |
| 4.874                                           | 3.0                                                                                            | 42.4                   | 27.2                     | 33.1                           | 6.3             | -34.8            | 0.0                          | 0.0               | 47.0                  | 31.9                 | 74                      | 54                       | -27.0               | -22.1                | H                     |
| 7.311                                           | 3.0                                                                                            | 42.0                   | 26.6                     | 35.8                           | 8.5             | -34.9            | 0.0                          | 0.0               | 51.4                  | 35.0                 | 74                      | 54                       | -22.6               | -18.0                | H                     |
| <b>Hi Channel (2462 MHz)</b>                    |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| 4.924                                           | 3.0                                                                                            | 42.0                   | 27.7                     | 33.2                           | 6.3             | -34.8            | 0.0                          | 0.0               | 46.7                  | 31.4                 | 74                      | 54                       | -27.3               | -21.6                | V                     |
| 7.386                                           | 3.0                                                                                            | 41.7                   | 27.5                     | 35.9                           | 8.5             | -34.9            | 0.0                          | 0.0               | 51.3                  | 37.0                 | 74                      | 54                       | -22.7               | -17.0                | V                     |
| 4.924                                           | 3.0                                                                                            | 40.3                   | 26.7                     | 33.2                           | 6.3             | -34.8            | 0.0                          | 0.0               | 45.0                  | 31.4                 | 74                      | 54                       | -29.0               | -22.6                | H                     |
| 7.386                                           | 3.0                                                                                            | 39.9                   | 24.9                     | 35.9                           | 8.5             | -34.9            | 0.0                          | 0.0               | 49.4                  | 34.4                 | 74                      | 54                       | -24.6               | -19.6                | H                     |
| Rev. 11.10.11                                   |                                                                                                |                        |                          |                                |                 |                  |                              |                   |                       |                      |                         |                          |                     |                      |                       |
| 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. WORST-CASE BELOW 1 GHz

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

##### HORIZONTAL AND VERTICAL DATA

| Project No:12J14449                      |               |          |                                     |                           |        |                           |        |             |          |
|------------------------------------------|---------------|----------|-------------------------------------|---------------------------|--------|---------------------------|--------|-------------|----------|
| Client Name:Mitsumi Electronic Co. Ltd.  |               |          |                                     |                           |        |                           |        |             |          |
| Model / Device:DWM-W051                  |               |          |                                     |                           |        |                           |        |             |          |
| Config / Other:EUT and Support Equipment |               |          |                                     |                           |        |                           |        |             |          |
| Test By:M. Mekuria                       |               |          |                                     |                           |        |                           |        |             |          |
| Horizontal 30 - 1000MHz                  |               |          |                                     |                           |        |                           |        |             |          |
| Test Frequency                           | Meter Reading | Detector | 25MHz-1GHz ChmbrA Amplified.TX (dB) | T243 Sunol Bilog.TXT (dB) | dBuV/m | CFR 47 Part 15 Class B 3m | Margin | Height [cm] | Polarity |
| 47.0584                                  | 36.81         | PK       | -27.4                               | 9.4                       | 18.81  | 40                        | -21.19 | 300         | Horz     |
| 73.2274                                  | 49.89         | PK       | -27.1                               | 8.1                       | 30.89  | 40                        | -9.11  | 100         | Horz     |
| 866.247                                  | 40.86         | PK       | -23.2                               | 21.4                      | 39.06  | 46                        | -6.94  | 100         | Horz     |
| Vertical 30 - 1000MHz                    |               |          |                                     |                           |        |                           |        |             |          |
| Test Frequency                           | Meter Reading | Detector | 25MHz-1GHz ChmbrA Amplified.TX (dB) | T243 Sunol Bilog.TXT (dB) | dBuV/m | CFR 47 Part 15 Class B 3m | Margin | Height [cm] | Polarity |
| 40.2738                                  | 41.93         | PK       | -27.3                               | 13.7                      | 28.33  | 40                        | -11.67 | 100         | Vert     |
| 93.775                                   | 55.29         | PK       | -27                                 | 8.5                       | 36.79  | 43.5                      | -6.71  | 100         | Vert     |

## 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

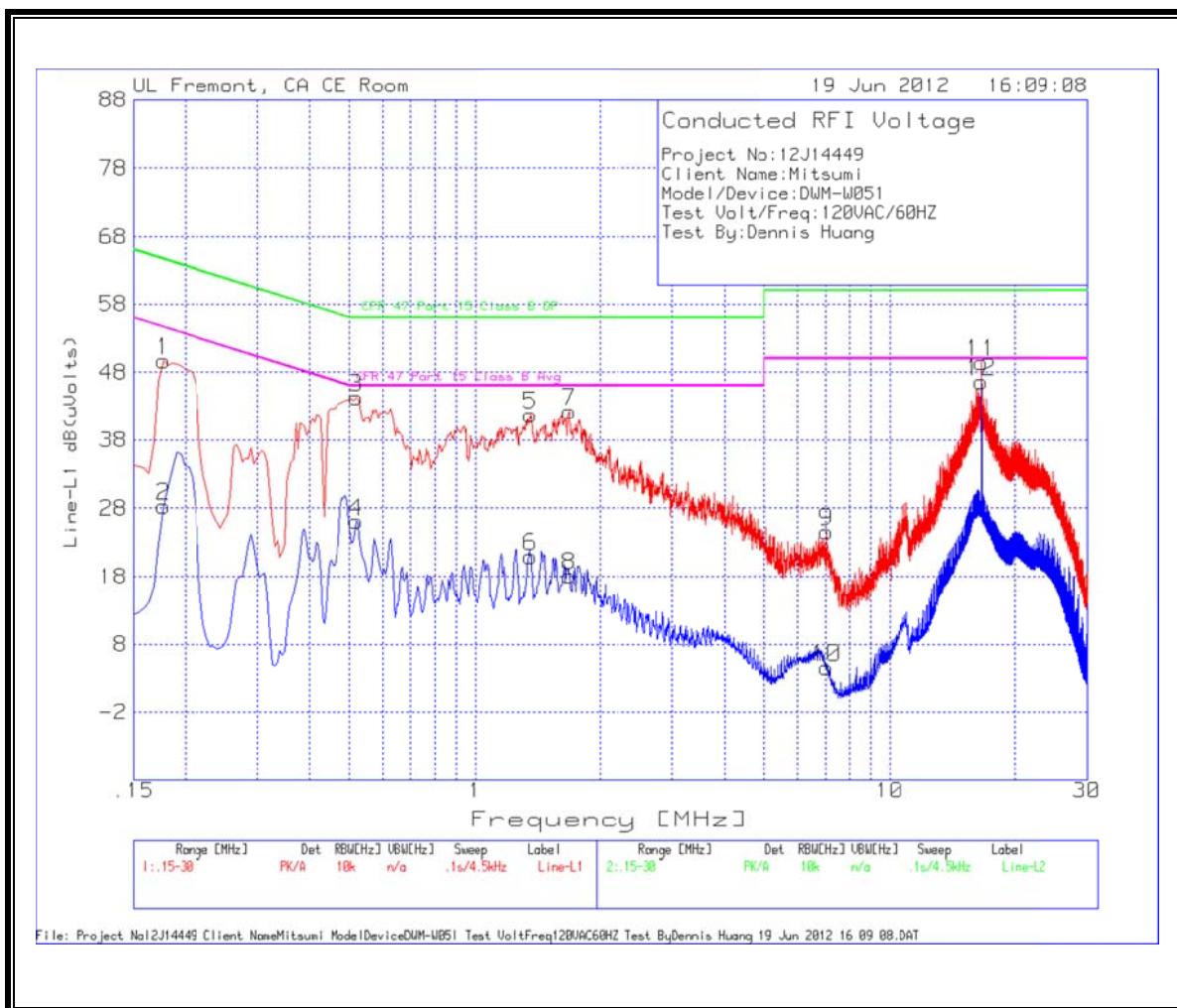
### RESULTS

**SUPPORT LAPTOP**

**6 WORST EMISSIONS**

| Project No:12J14449        |               |          |                    |                        |            |                           |        |                            |        |
|----------------------------|---------------|----------|--------------------|------------------------|------------|---------------------------|--------|----------------------------|--------|
| Client Name:Mitsumi        |               |          |                    |                        |            |                           |        |                            |        |
| Model/Device:DWM-W051      |               |          |                    |                        |            |                           |        |                            |        |
| Test Volt/Freq:120VAC/60HZ |               |          |                    |                        |            |                           |        |                            |        |
| Test By:Dennis Huang       |               |          |                    |                        |            |                           |        |                            |        |
| Line-L1 .15 - 30MHz        |               |          |                    |                        |            |                           |        |                            |        |
| Test Frequency             | Meter Reading | Detector | T24 IL L1.TXT (dB) | LC Cables 1&3.TXT (dB) | dB(uVolts) | CFR 47 Part 15 Class B QP | Margin | CFR 47 Part 15 Class B Avg | Margin |
| 0.177                      | 49.55         | PK       | 0.1                | 0                      | 49.65      | 64.6                      | -14.95 | -                          | -      |
| 0.177                      | 28.25         | Av       | 0.1                | 0                      | 28.35      | -                         | -      | 54.6                       | -26.25 |
| 0.519                      | 44.17         | PK       | 0.1                | 0                      | 44.27      | 56                        | -11.73 | -                          | -      |
| 0.519                      | 25.95         | Av       | 0.1                | 0                      | 26.05      | -                         | -      | 46                         | -19.95 |
| 1.3605                     | 41.56         | PK       | 0.1                | 0.1                    | 41.76      | 56                        | -14.24 | -                          | -      |
| 1.3605                     | 20.73         | Av       | 0.1                | 0.1                    | 20.93      | -                         | -      | 46                         | -25.07 |
| 1.6845                     | 42.05         | PK       | 0.1                | 0.1                    | 42.25      | 56                        | -13.75 | -                          | -      |
| 1.6845                     | 17.9          | Av       | 0.1                | 0.1                    | 18.1       | -                         | -      | 46                         | -27.9  |
| 7.044                      | 24.35         | PK       | 0.1                | 0.1                    | 24.55      | 60                        | -35.45 | -                          | -      |
| 7.044                      | 4.43          | Av       | 0.1                | 0.1                    | 4.63       | -                         | -      | 50                         | -45.37 |
| 16.6245                    | 49.03         | PK       | 0.2                | 0.2                    | 49.43      | 60                        | -10.57 | -                          | -      |
| 16.6245                    | 46.23         | Av       | 0.2                | 0.2                    | 46.63      | -                         | -      | 50                         | -3.37  |
| Line-L2 .15 - 30MHz        |               |          |                    |                        |            |                           |        |                            |        |
| Test Frequency             | Meter Reading | Detector | T24 IL L1.TXT (dB) | LC Cables 1&3.TXT (dB) | dB(uVolts) | CFR 47 Part 15 Class B QP | Margin | CFR 47 Part 15 Class B Avg | Margin |
| 0.177                      | 49.13         | PK       | 0.1                | 0                      | 49.23      | 64.6                      | -15.37 | -                          | -      |
| 0.177                      | 27.51         | Av       | 0.1                | 0                      | 27.61      | -                         | -      | 54.6                       | -26.99 |
| 0.5235                     | 44.05         | PK       | 0.1                | 0                      | 44.15      | 56                        | -11.85 | -                          | -      |
| 0.5235                     | 25.27         | Av       | 0.1                | 0                      | 25.37      | -                         | -      | 46                         | -20.63 |
| 1.365                      | 40.65         | PK       | 0.1                | 0.1                    | 40.85      | 56                        | -15.15 | -                          | -      |
| 1.365                      | 20.05         | Av       | 0.1                | 0.1                    | 20.25      | -                         | -      | 46                         | -25.75 |
| 1.68                       | 41.67         | PK       | 0.1                | 0.1                    | 41.87      | 56                        | -14.13 | -                          | -      |
| 1.68                       | 17.44         | Av       | 0.1                | 0.1                    | 17.64      | -                         | -      | 46                         | -28.36 |
| 10.7565                    | 29.69         | PK       | 0.2                | 0.2                    | 30.09      | 60                        | -29.91 | -                          | -      |
| 10.7565                    | 13.6          | Av       | 0.2                | 0.2                    | 14         | -                         | -      | 50                         | -36    |
| 16.6245                    | 50.94         | PK       | 0.2                | 0.2                    | 51.34      | 60                        | -8.66  | -                          | -      |
| 16.6245                    | 46.16         | Av       | 0.2                | 0.2                    | 46.56      | -                         | -      | 50                         | -3.44  |

**LINE 1 RESULTS**



**LINE 2 RESULTS**

