



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

**CERTIFICATION TEST REPORT**

**FOR**

**802.11bgn WLAN MODULE**

**MODEL NUMBER: DWM-W069**

**FCC ID: EW4DWMW069**

**IC: 4250A-DWMW069**

**REPORT NUMBER: 11J14026-1, Revision A**

**ISSUE DATE: SEPTEMBER 30, 2011**

*Prepared for*

**MITSUMI ELECTRIC CO., LTD.  
1601, SAKAI, ATSUGI-SHI,  
KANAGAWA, 243-8533, JAPAN**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES (UL CCS)  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	09/29/11	Initial Issue	F. Ibrahim
A	09/30/11	Updated section 2, added "Type A" phrase to 30-1000 MHz, LC and RX data.	F. Ibrahim

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# 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** 802.11bgn WLAN MODULE

**MODEL:** DWM-W069

**SERIAL NUMBER:** A29, B37 and C32 (Conducted)  
A11, B39 and C39 (Radiated)

**DATE TESTED:** SEPTEMBER 6 to 28, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services, Inc. (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:



FRANK IBRAHIM  
EMC SUPERVISOR  
UL CCS

Tested By:



THANH NGUYEN  
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 an 802.11bgn WLAN module with 1 antenna model RT3370 that is manufactured by Ralink.

The EUT has three samples (Type A, Type B and Type C) whose difference is the production lot.

### 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)
Type A			
2412 - 2462	802.11b	17.24	52.97
2412 - 2462	802.11g	22.17	164.82
2412 - 2462	802.11n HT20	22.66	184.50
Type B			
2412 - 2462	802.11b	16.60	45.71
2412 - 2462	802.11g	21.67	146.89
2412 - 2462	802.11n HT20	22.60	181.97
Type C			
2412 - 2462	802.11b	16.55	45.19
2412 - 2462	802.11g	21.74	149.28
2412 - 2462	802.11n HT20	21.91	155.24

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 1x1 diversity antenna system consisting of 2 units of the same PCB-Type antenna with maximum gain of 1.41 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was RT3x7x\_ATE\_Utility\_v1.3.3.14.

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## 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module connected to a host Laptop PC via USB cable.

The worst-case data rates used during the tests are as follows:

802.11b Mode (20 MHz BW operation): 1 Mbps, CCK.  
802.11g Mode (20 MHz BW operation): 6 Mbps, OFDM.  
802.11n HT20 Mode (20 MHz BW operation): MCS0, OFDM.

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

The EUT was investigated at X, Y, and Z antenna orientations to find out the worst-case. After the investigation, it was determined that X orientation is worst-case; therefore, all final testing was performed with the EUT placed in the X orientation.



## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	Manufacturer	Model	Serial Number
Laptop	HP	Presario F700	CNF7458G3Q
AC/DC Adapter	HP	PPP009H	F3-07091411250E

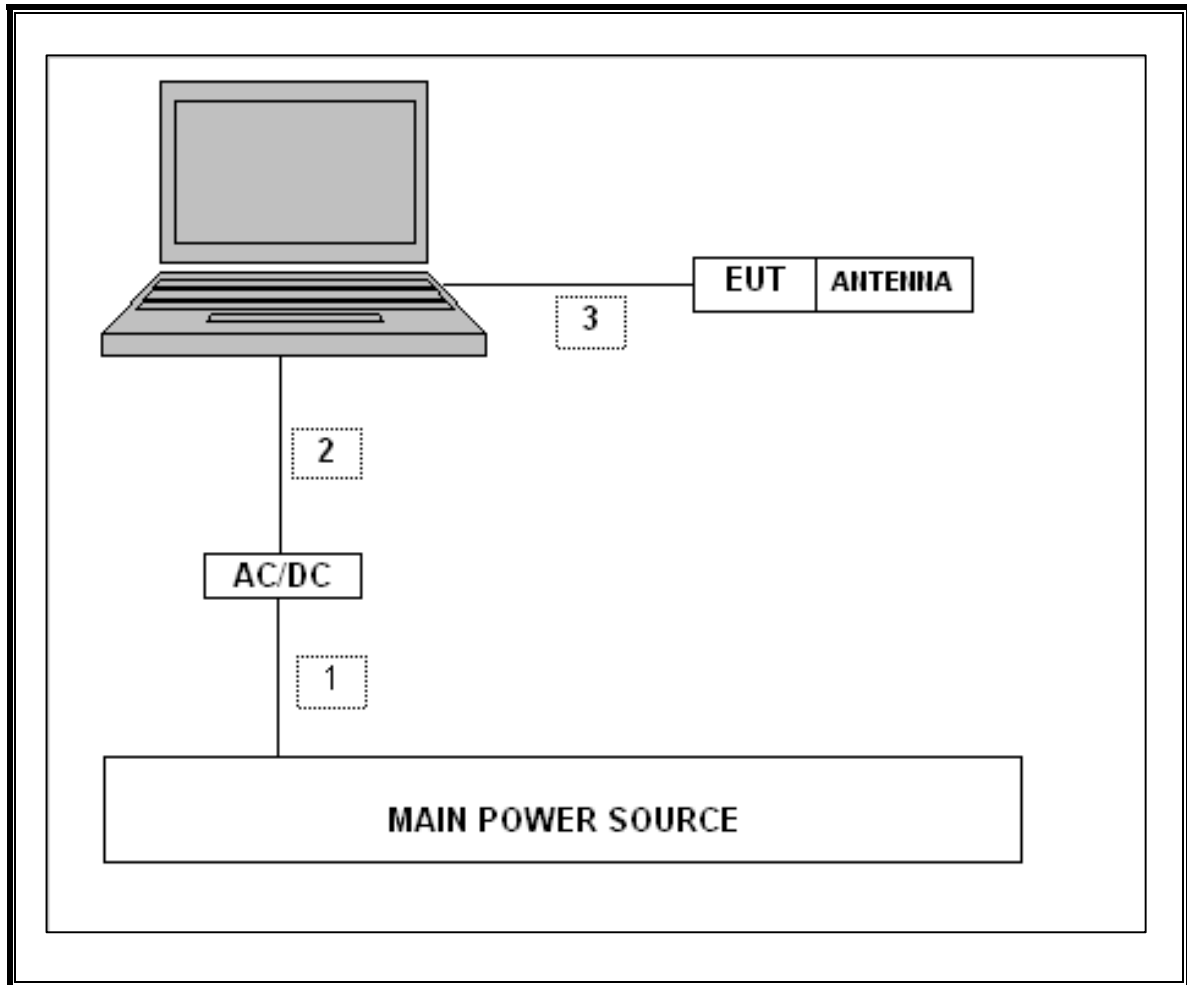
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115V	Unshielded	1m	N/A
2	DC	1	DC Plug in	Unshielded	1.5m	N/A
3	USB	1	USB	Shielded	1.5 m	To support Laptop

### TEST SETUP

The EUT was connected to the laptop via USB and extended cable during the test. Test software exercised the radio card.

**SETUP DIAGRAM FOR LINE CONDUCTION TEST**



## 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	04/19/12
Antenna, Bilog, 2 GHz	Sundt Sciences	JB1	C01011	07/16/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/27/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/12
Antenna, Horn, 26 GHz	ARA	1013	C00589	07/28/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/12/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	None	07/06/12
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/11
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	11/10/11
Peak Power Meter	Agilent / HP	E4416A	C00963	03/23/12
Peak / Average Power Sensor	Agilent / HP	E93273A	CCS0111	07/01/12

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 802.11b MODE

#### 7.1.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

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

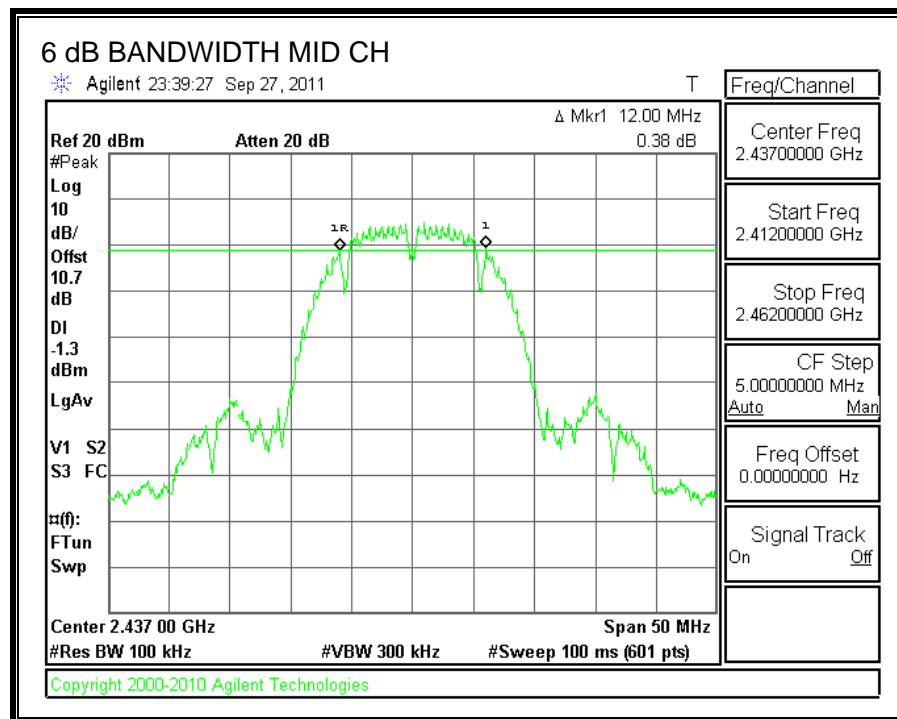
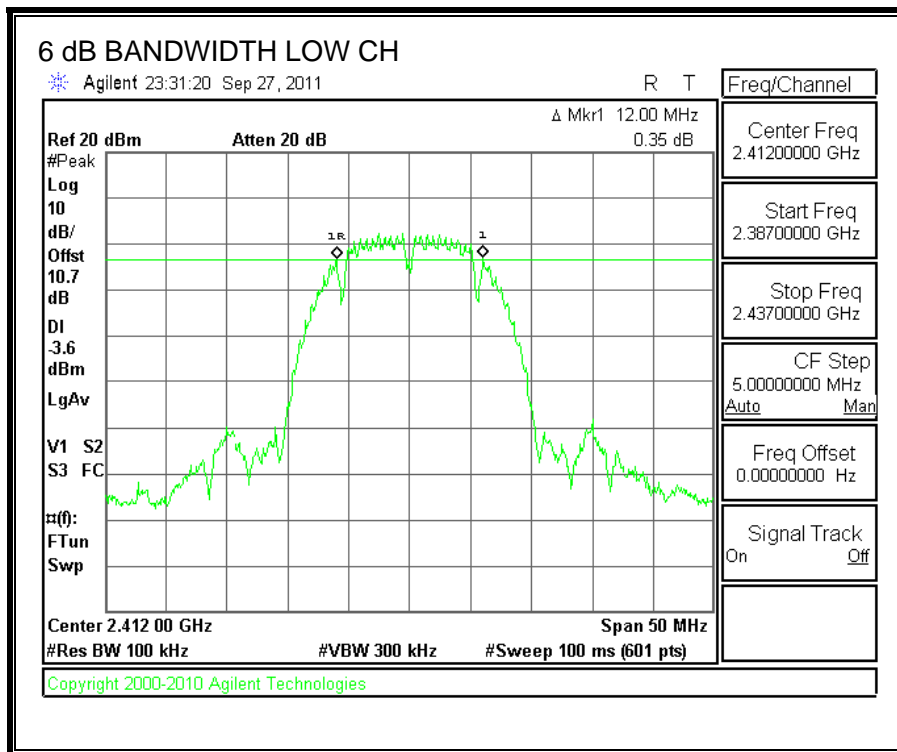
##### TEST PROCEDURE

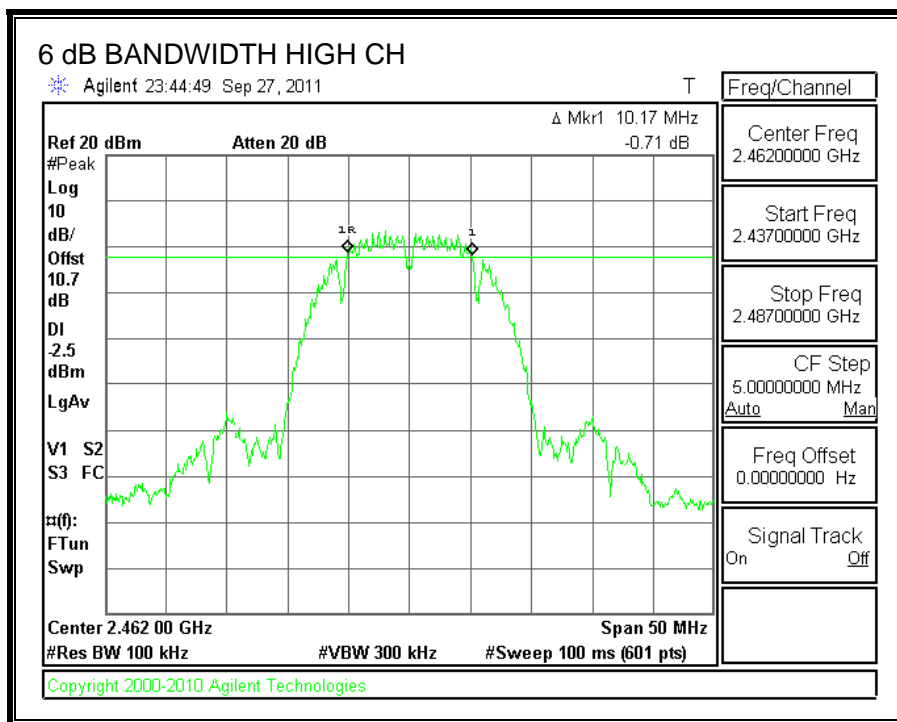
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

##### RESULTS:

Type A

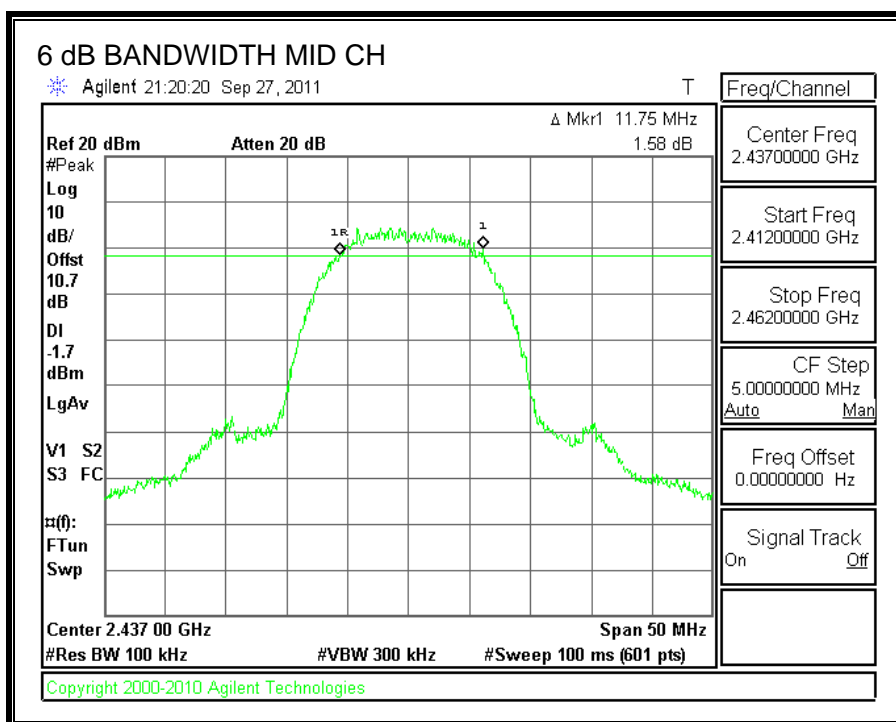
Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Low	2412	12.00	0.5
Middle	2437	12.00	0.5
High	2462	10.17	0.5





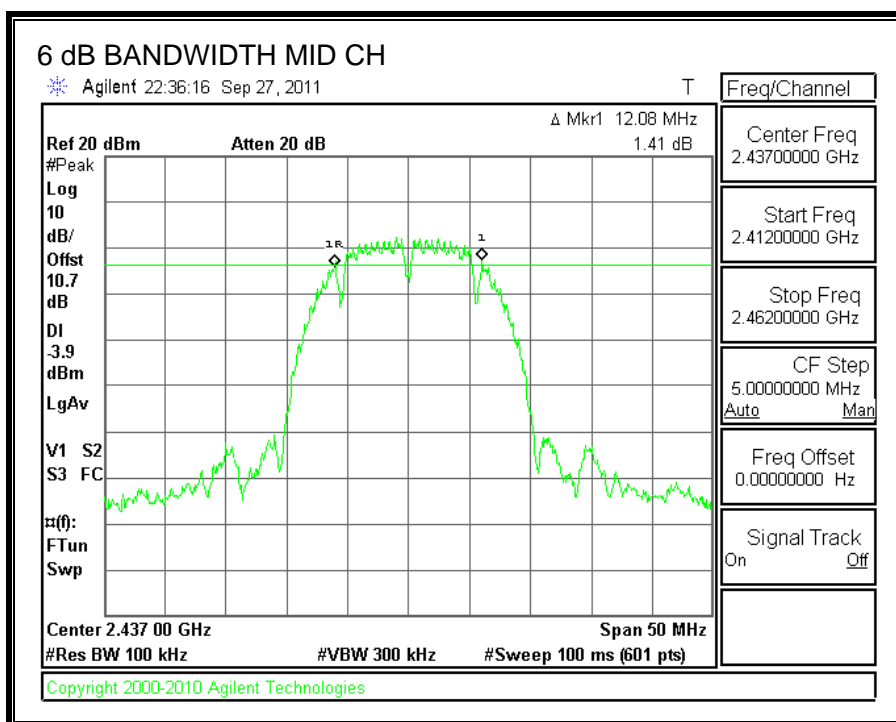
Type B:

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Middle	2437	11.75	0.5



Type C:

Channel	Frequency (MHz)	6 dB BW (MHz)	Minimum Limit (MHz)
Middle	2437	12.08	0.5





### 7.1.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

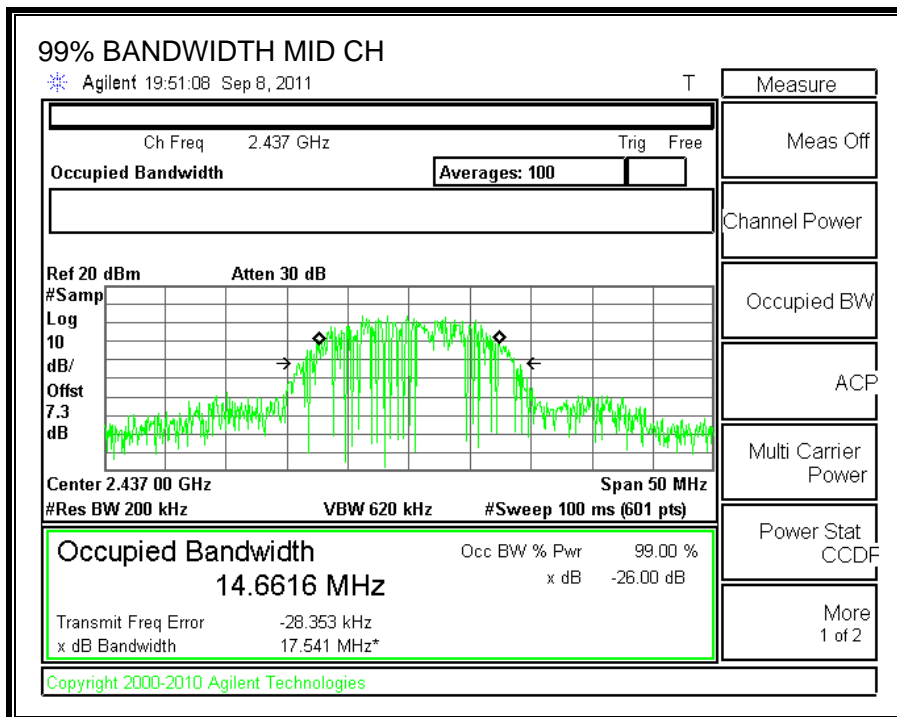
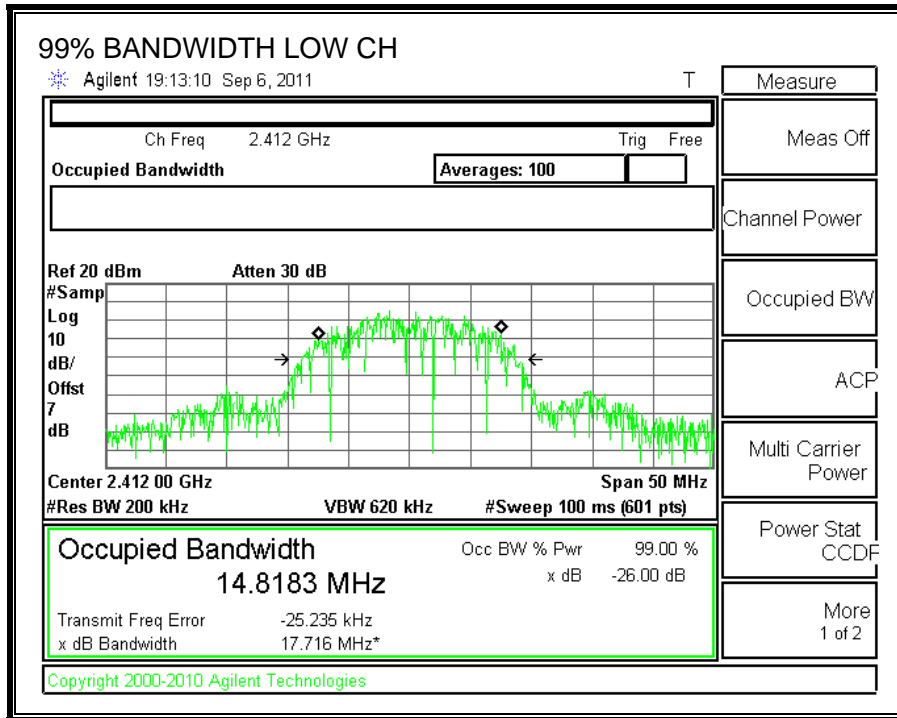
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

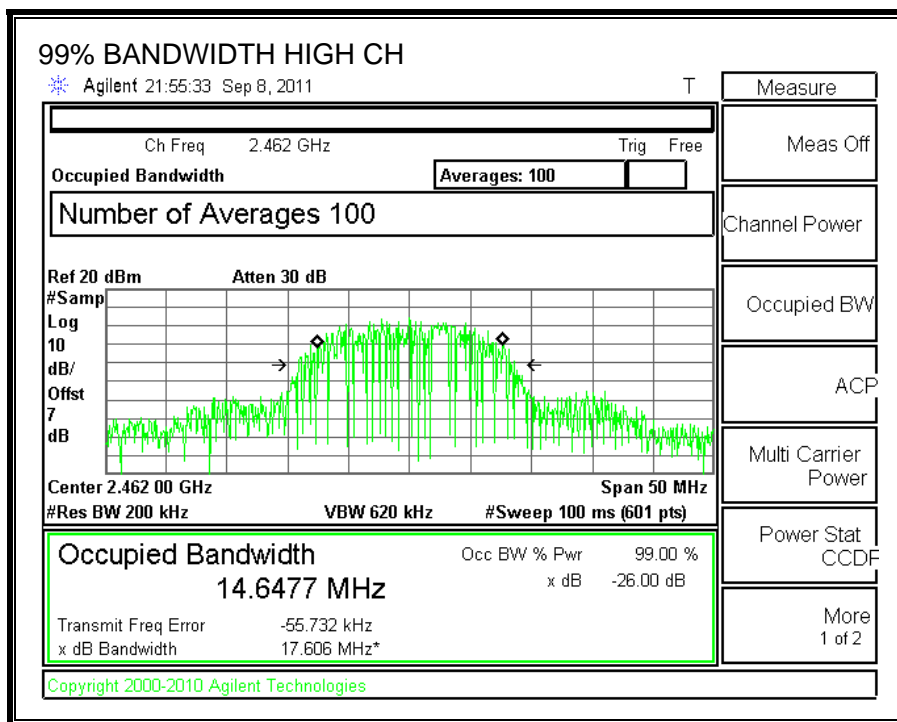
#### RESULTS

Type A:

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	14.8183
Middle	2437	14.6616
High	2462	14.6477

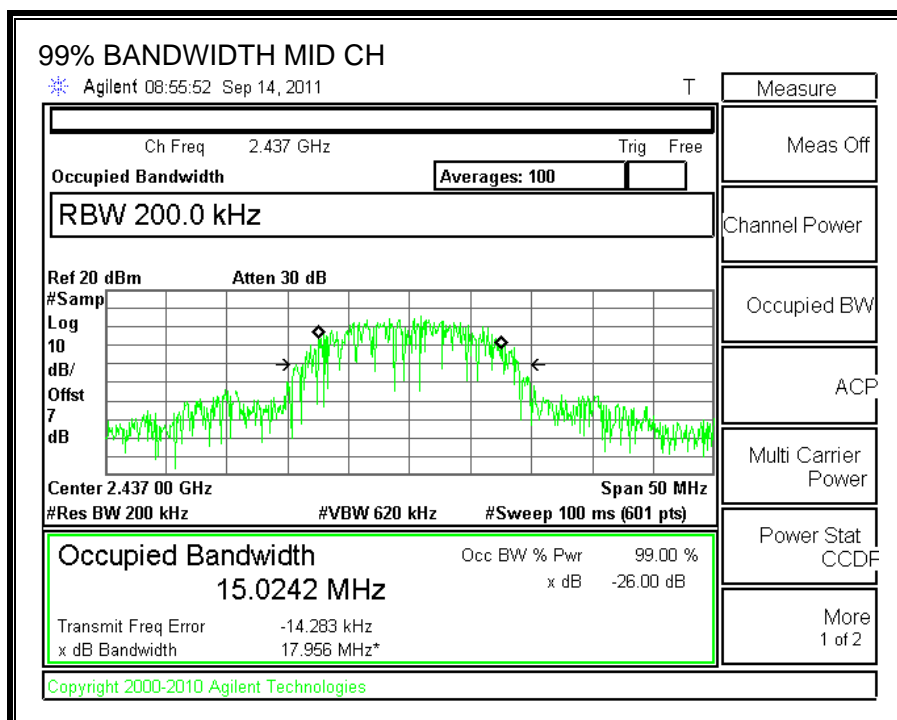
**99% BANDWIDTH**





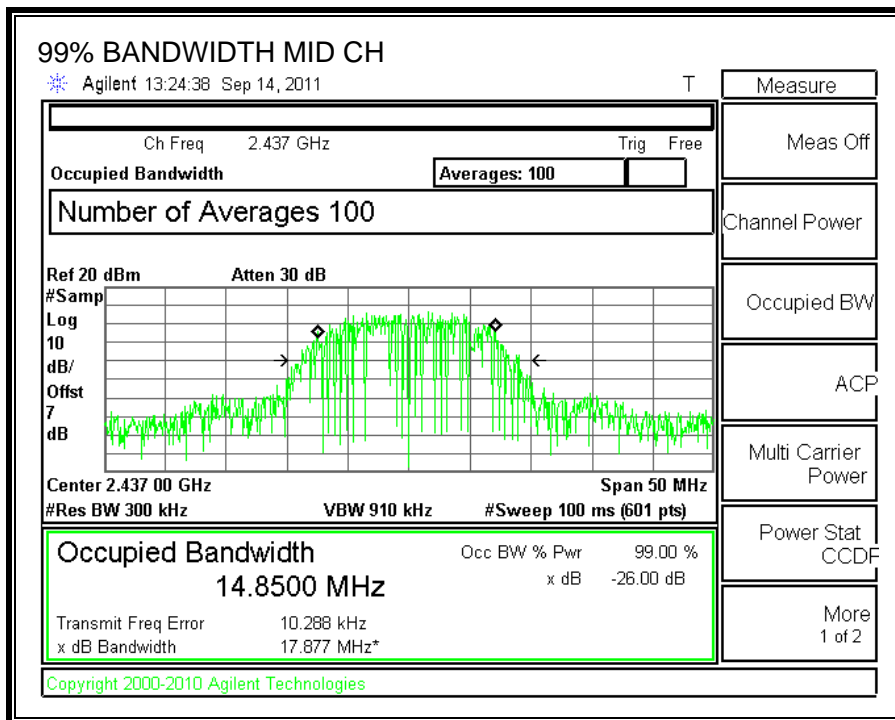
Type B:

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	15.0242



Type C:

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	14.8500



### 7.1.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

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

#### TEST PROCEDURE

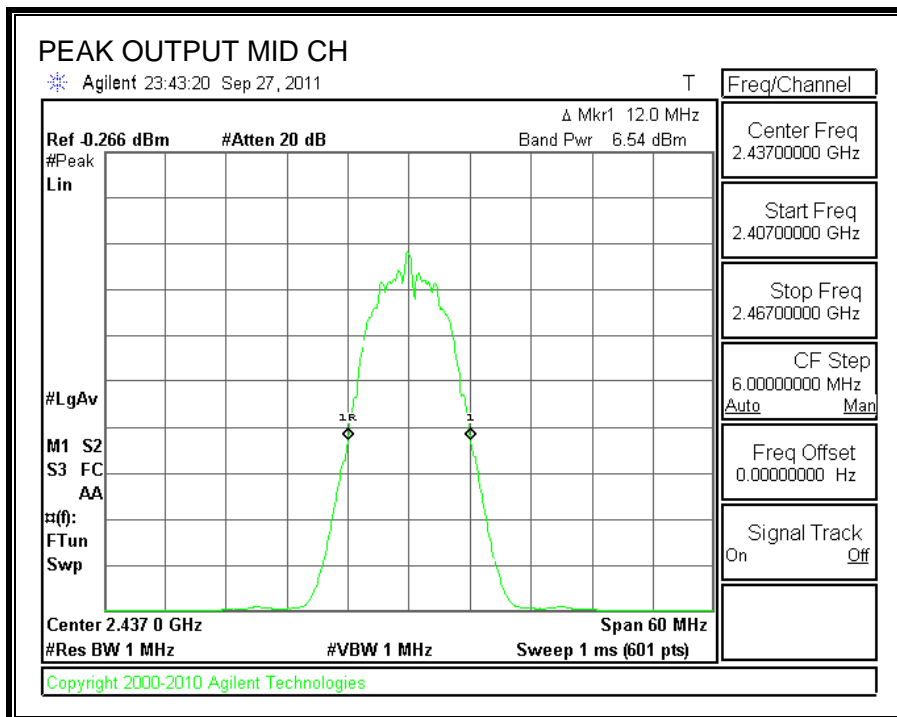
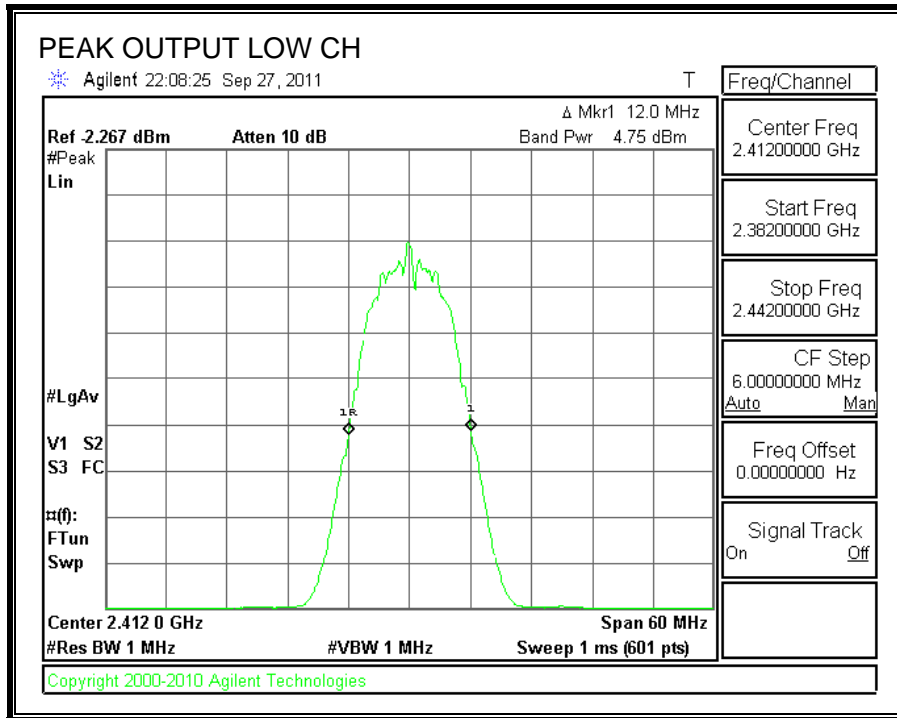
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

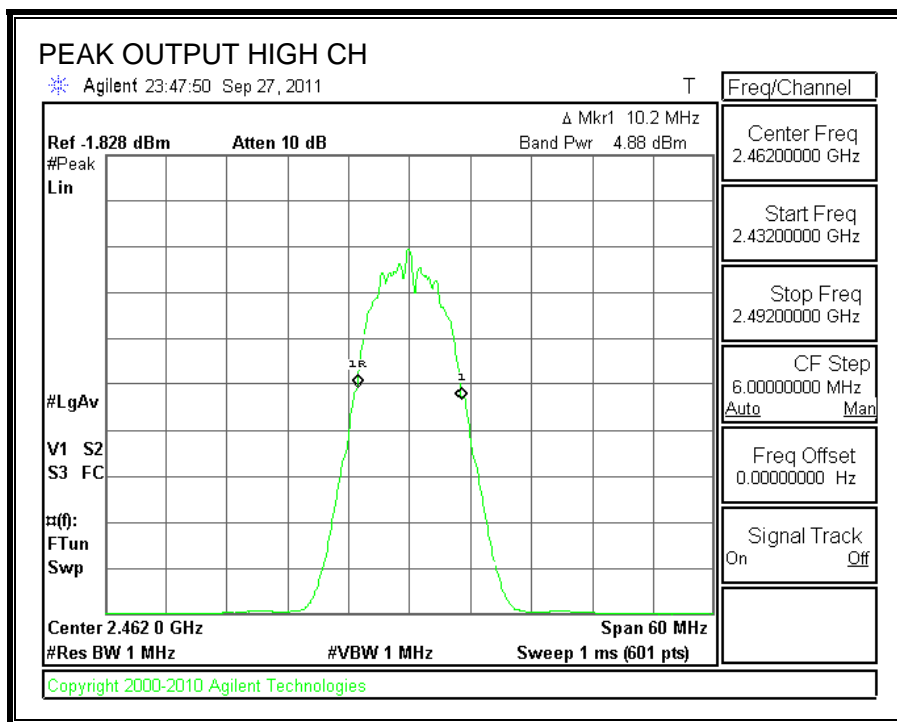
#### RESULTS

Type A:

Channel	Frequency (MHz)	Power Meter Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	4.750	10.7	15.45	30	-14.55
Middle	2437	6.540	10.7	17.24	30	-12.76
High	2462	4.880	10.7	15.58	30	-14.42

**PEAK OUTPUT POWER**



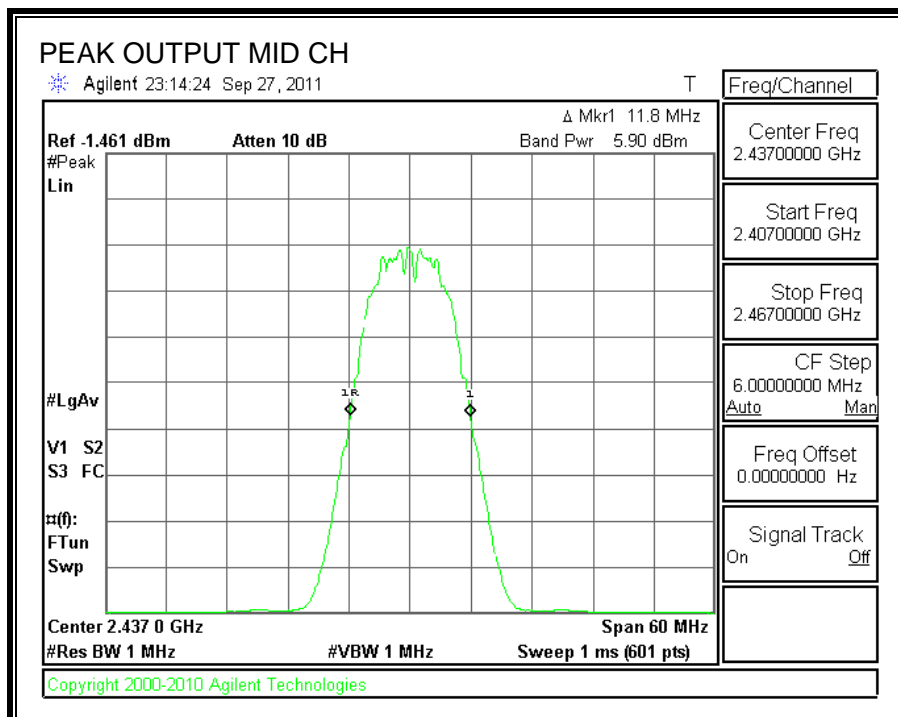




**Type B:**

**PEAK OUTPUT POWER**

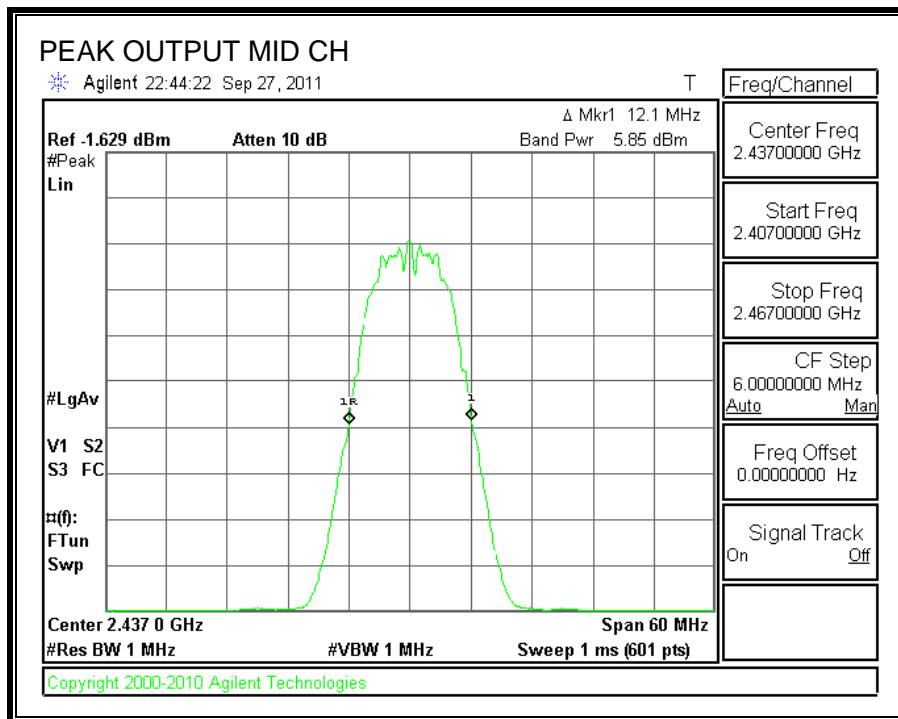
Channel	Frequency (MHz)	Power Meter Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	5.900	10.7	16.60	30	-13.40



**Type C:**

**PEAK OUTPUT POWER**

Channel	Frequency (MHz)	Power Meter Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	5.850	10.7	16.55	30	-13.45



### 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 10.7dB (including 10 dB pad and .7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### Type A:

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.26
Middle	2437	13.86
High	2462	13.08

#### Type B:

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.13
Middle	2437	14.44
High	2462	13.45

#### Type C:

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.26
Middle	2437	14.25
High	2462	13.03

### 7.1.5. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

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

#### TEST PROCEDURE

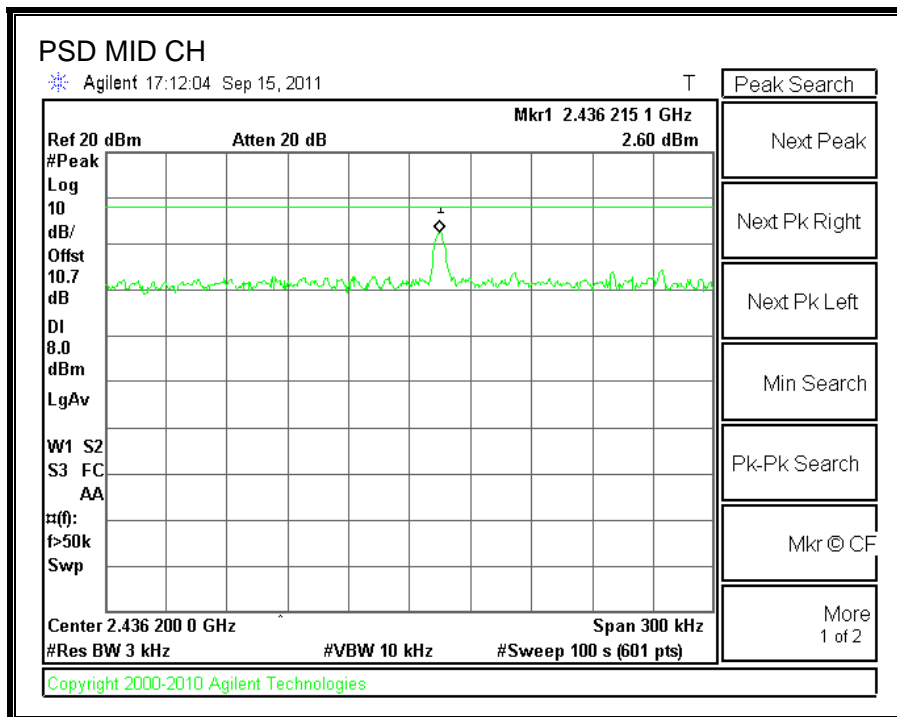
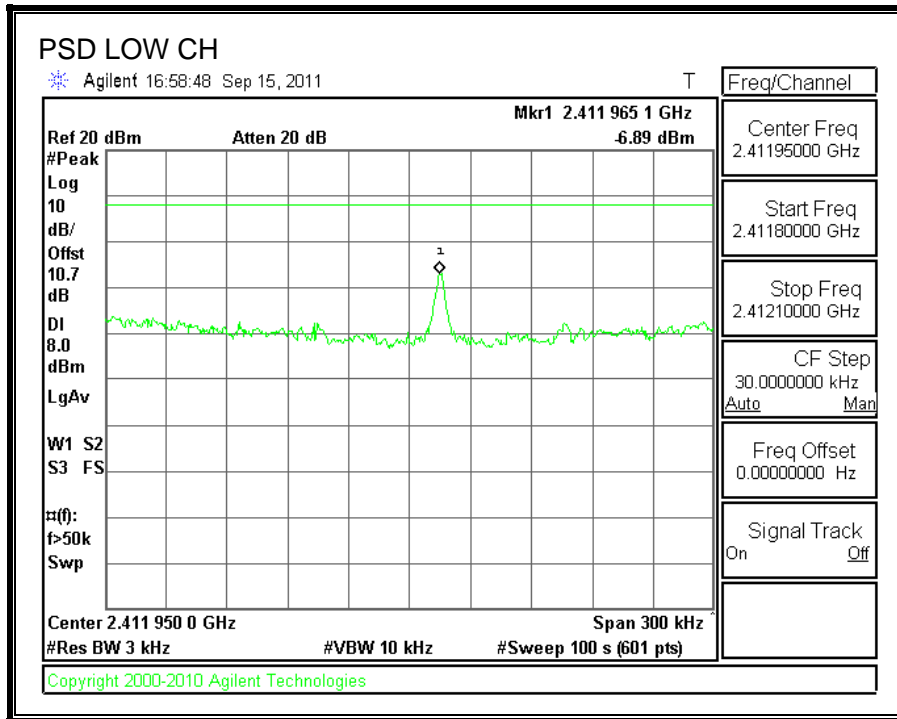
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

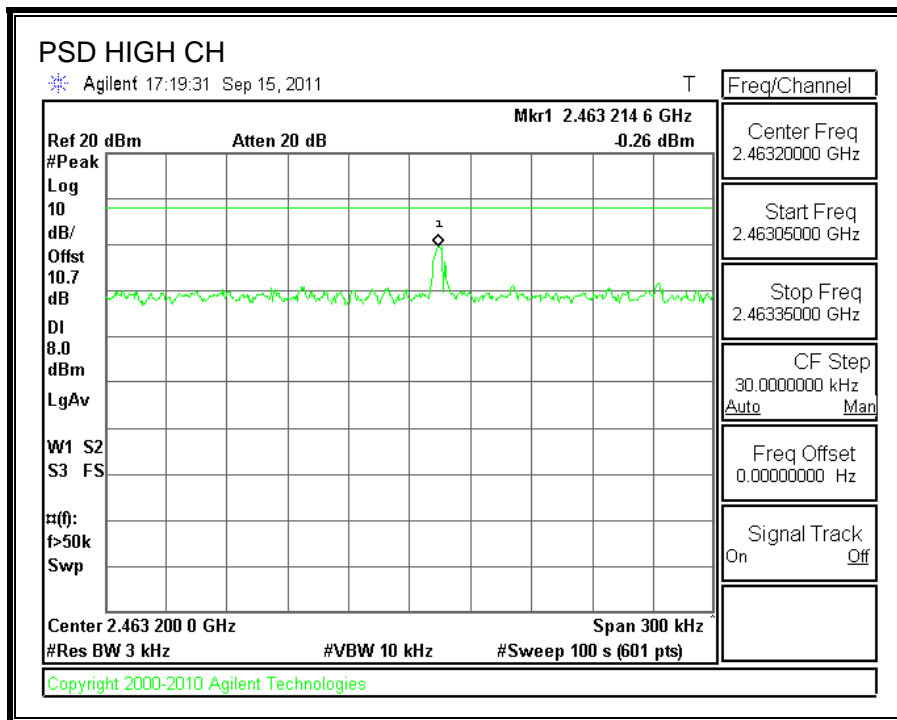
#### RESULTS:

Type A:

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.89	8	-14.89
Middle	2437	2.60	8	-5.40
High	2462	-0.26	8	-8.26

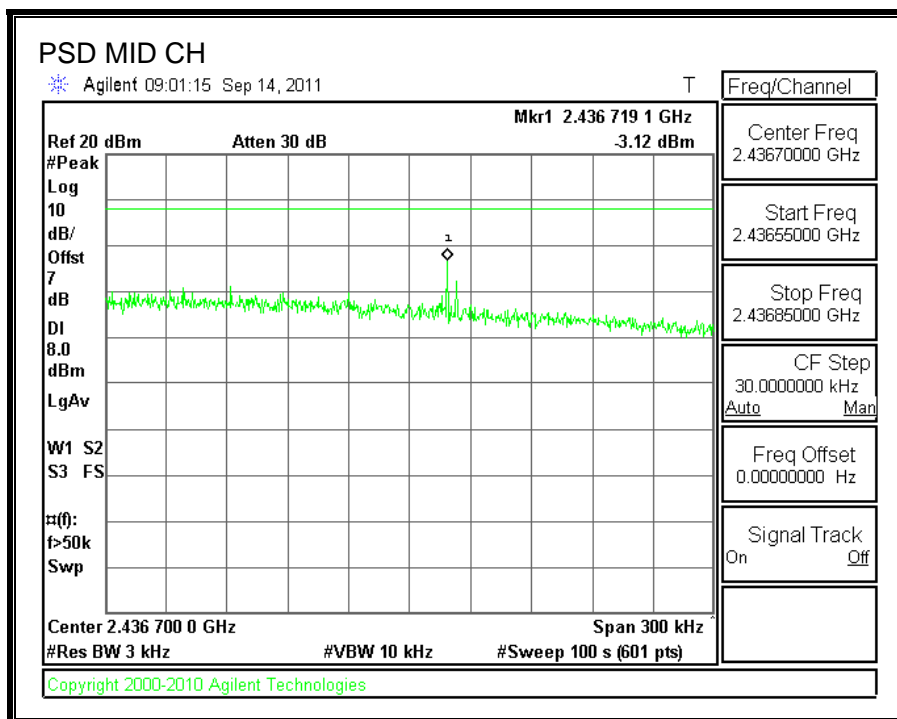
**POWER SPECTRAL DENSITY**





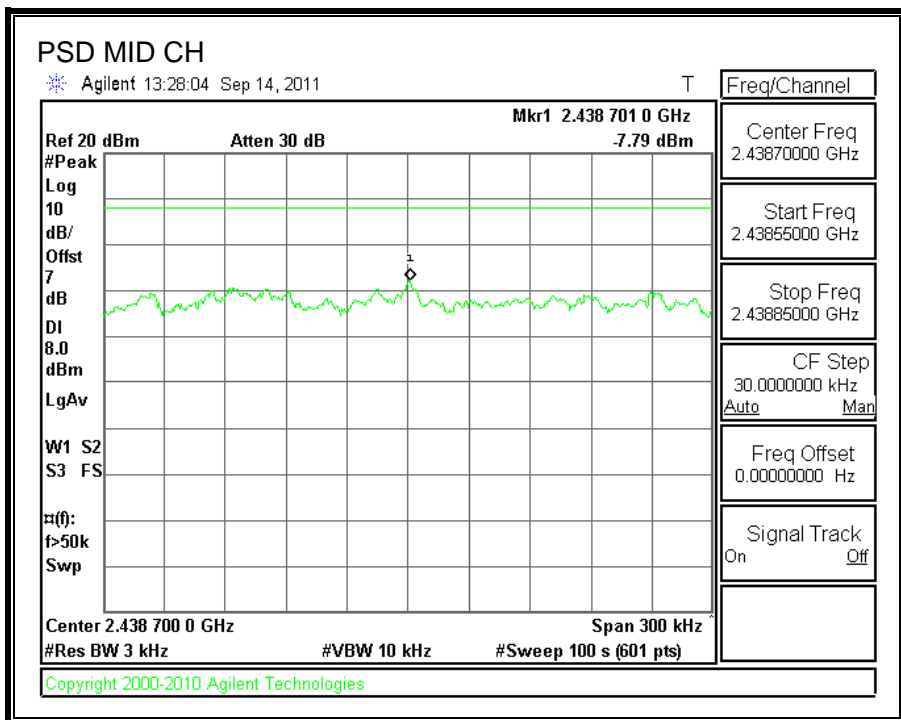
Type B:

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-3.12	8	-11.12



Type C:

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-7.79	8	-15.79





### **7.1.6. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

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

#### **TEST PROCEDURE**

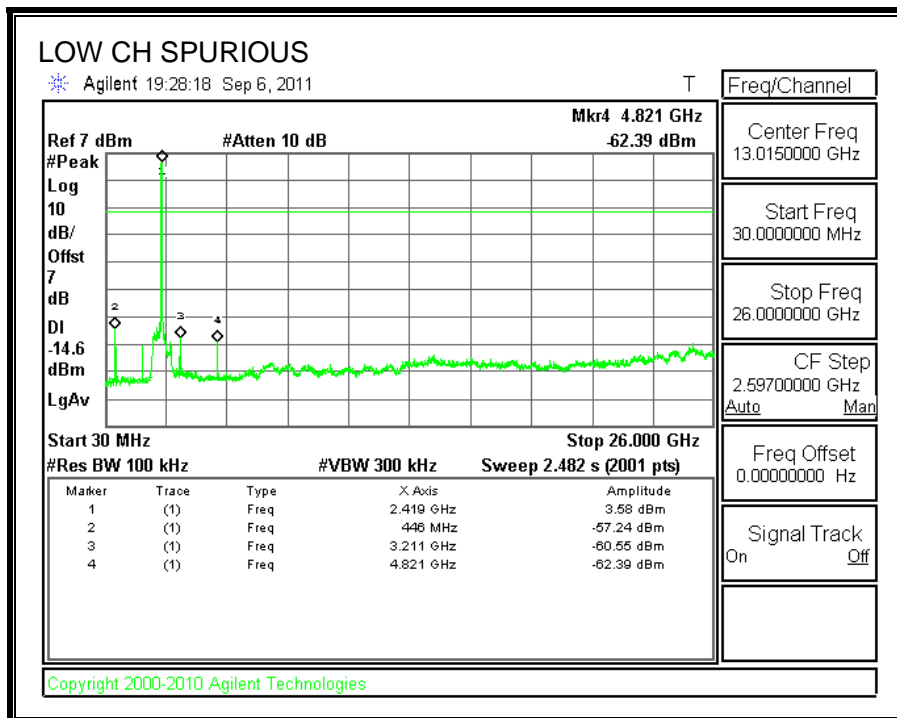
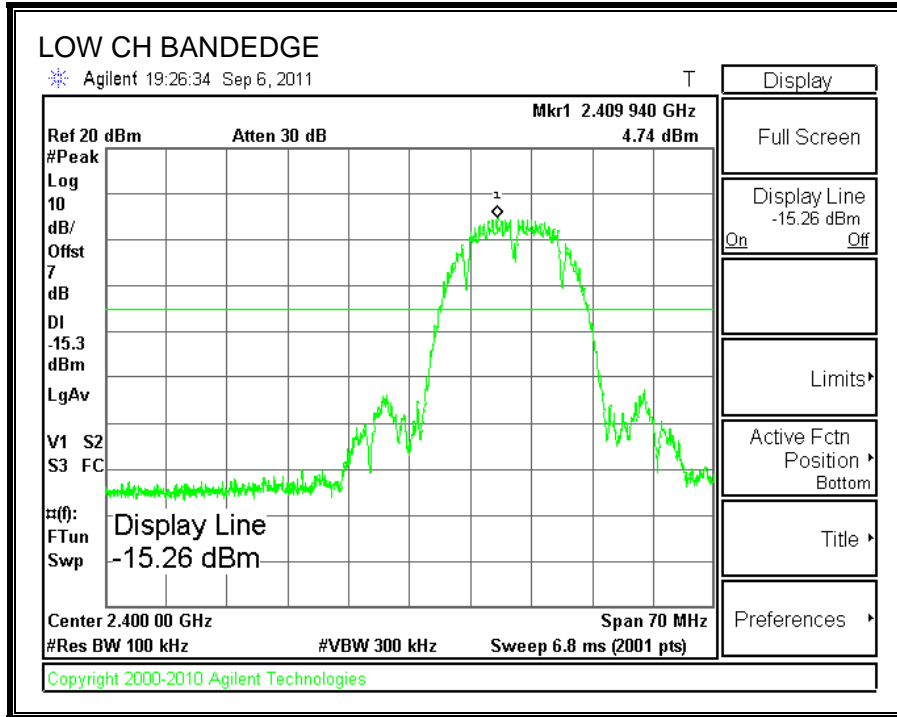
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

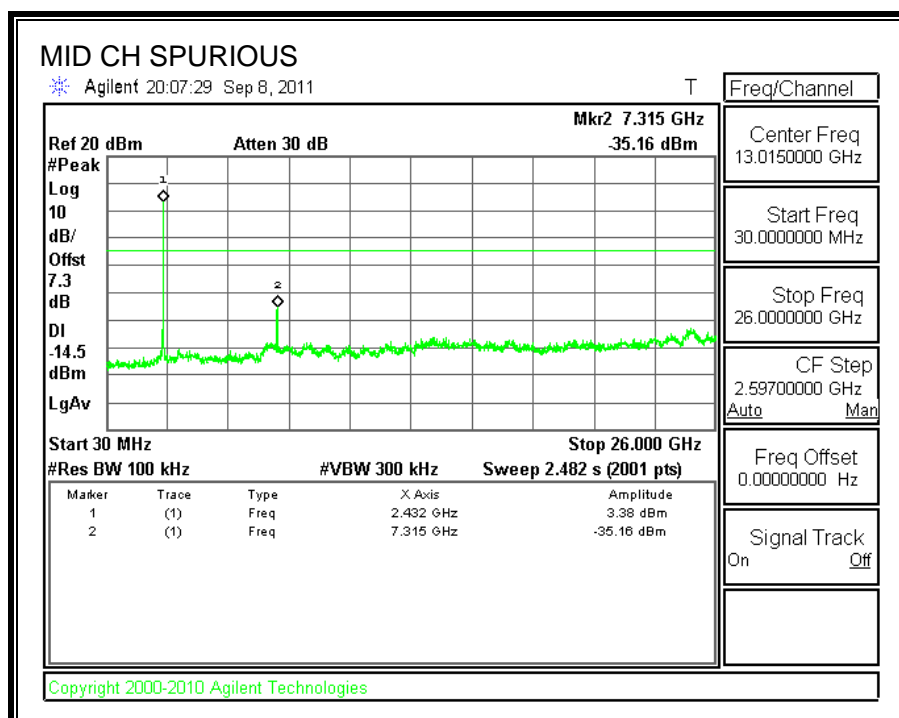
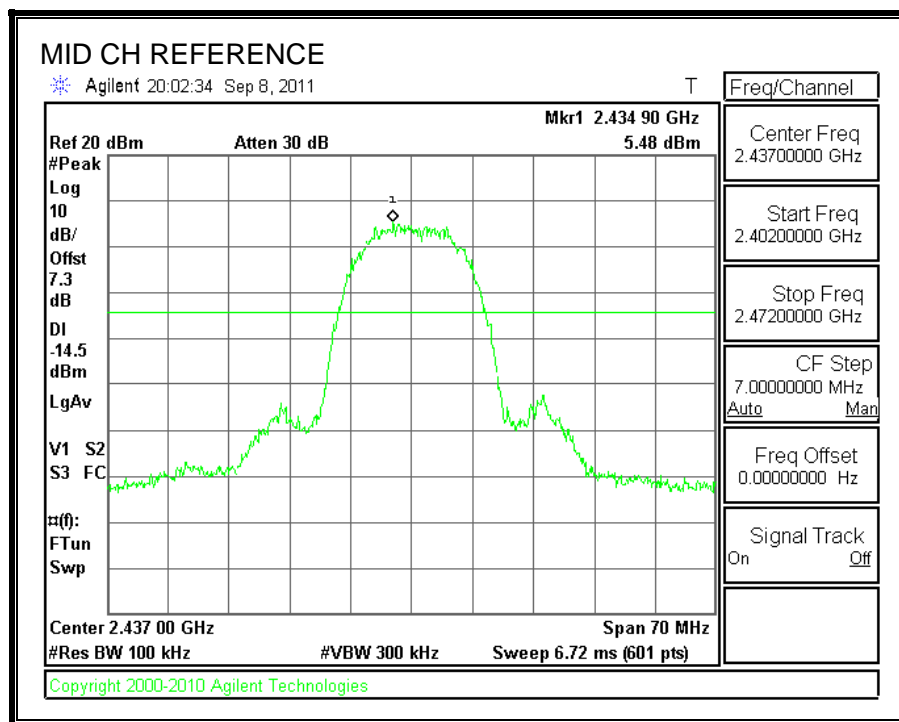
**RESULTS**

Type A:

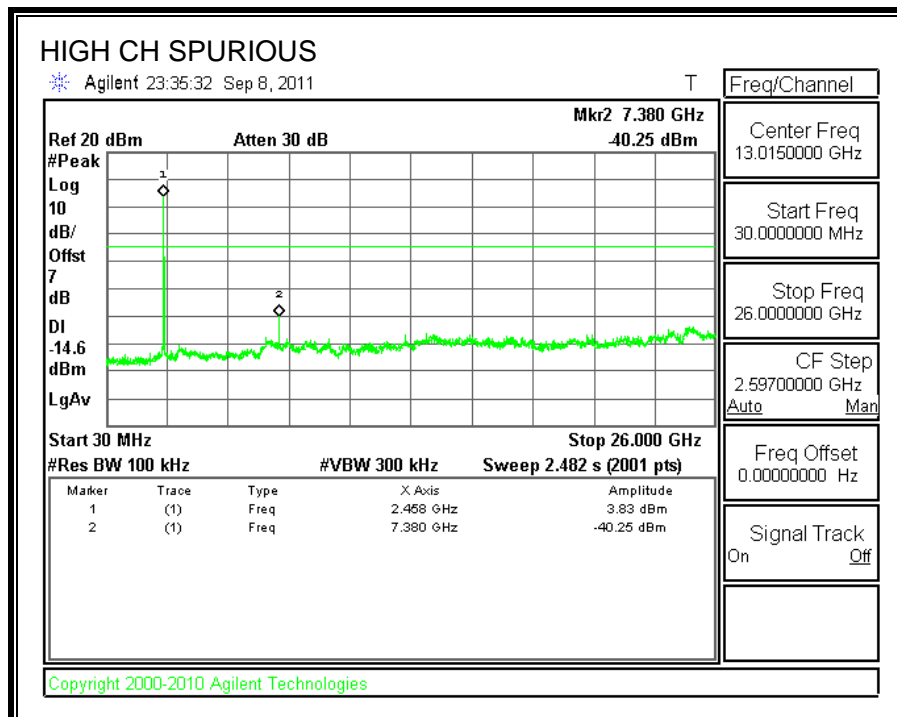
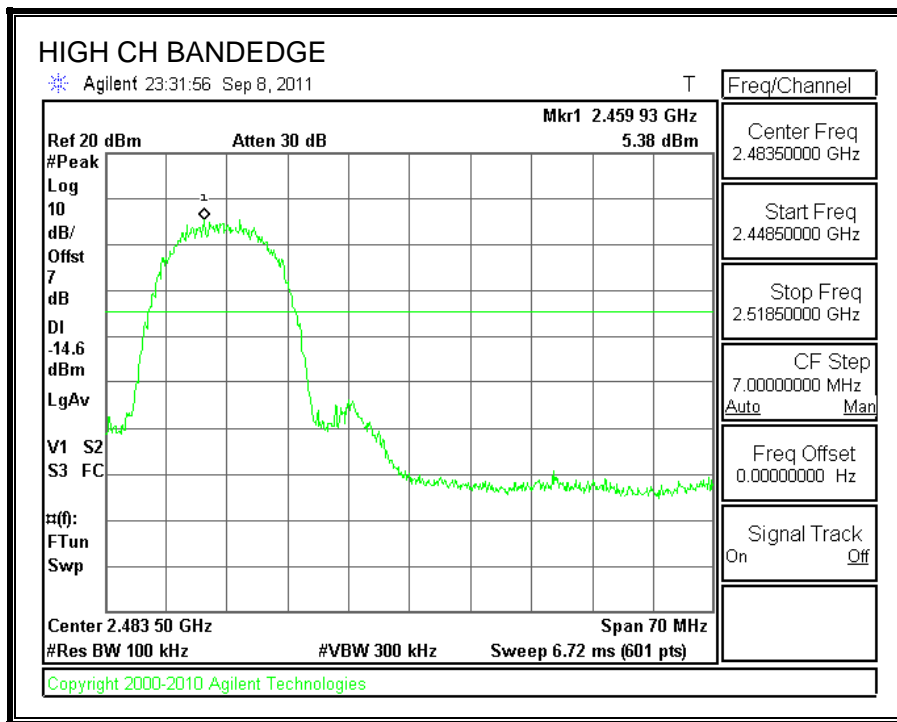
**SPURIOUS EMISSIONS, LOW CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**

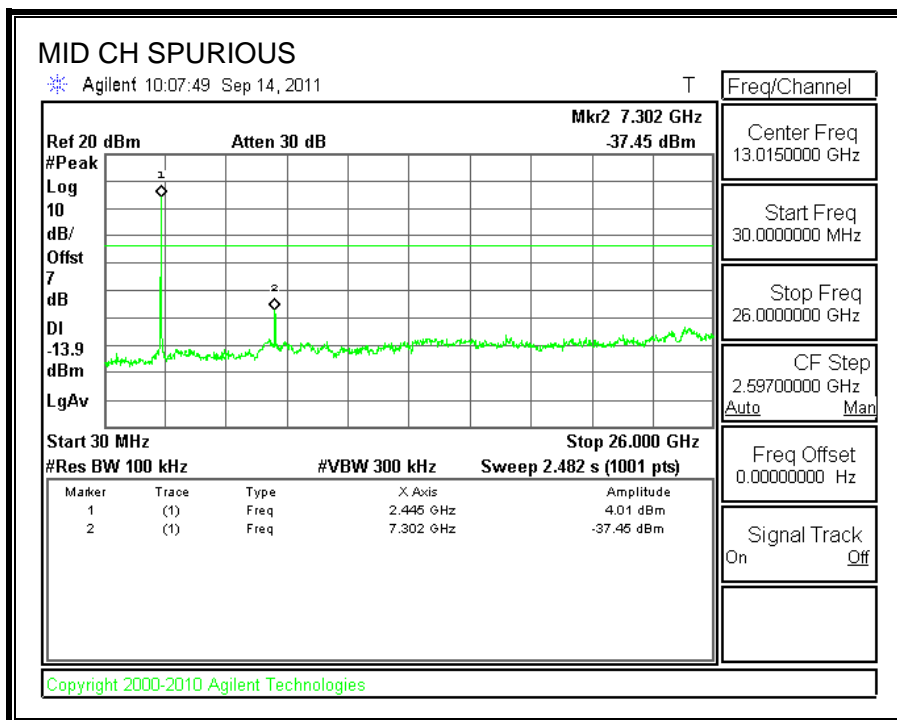
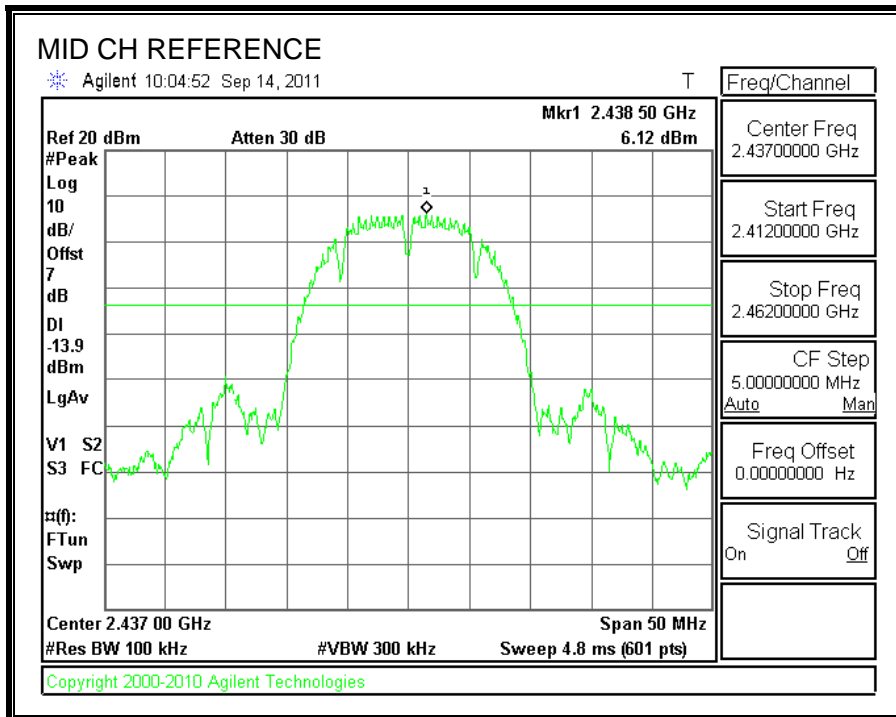


**SPURIOUS EMISSIONS, HIGH CHANNEL**



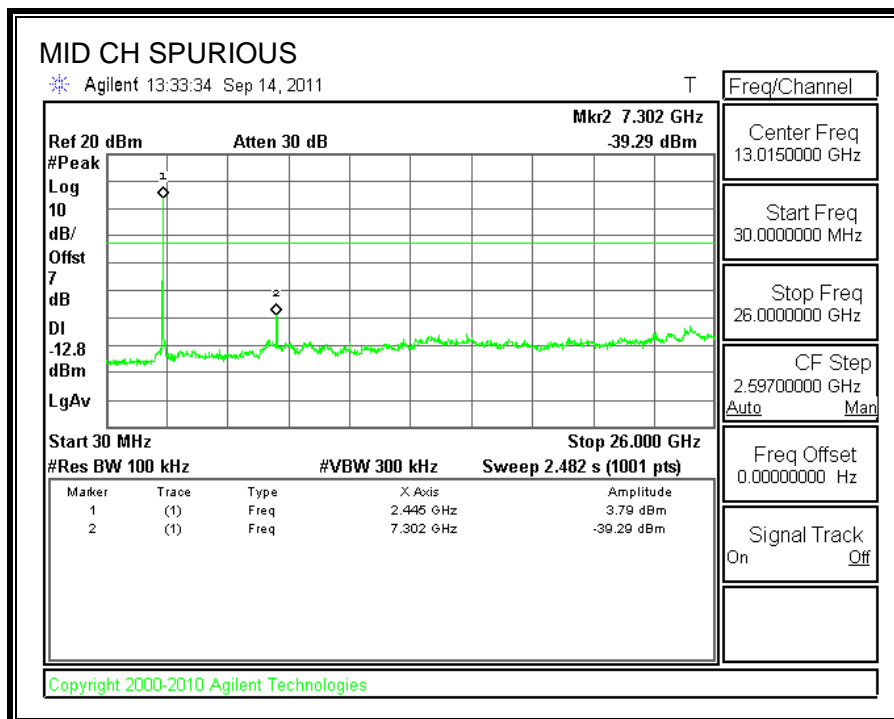
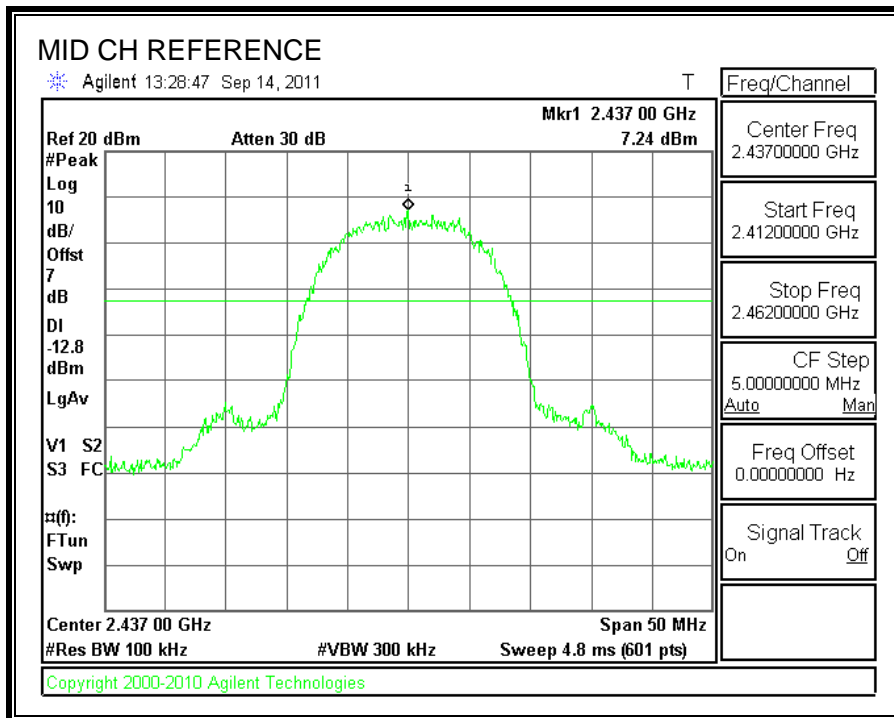
Type B:

**SPURIOUS EMISSIONS, MID CHANNEL**



Type C:

**SPURIOUS EMISSIONS, MID CHANNEL**



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

### 7.2.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

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

#### TEST PROCEDURE

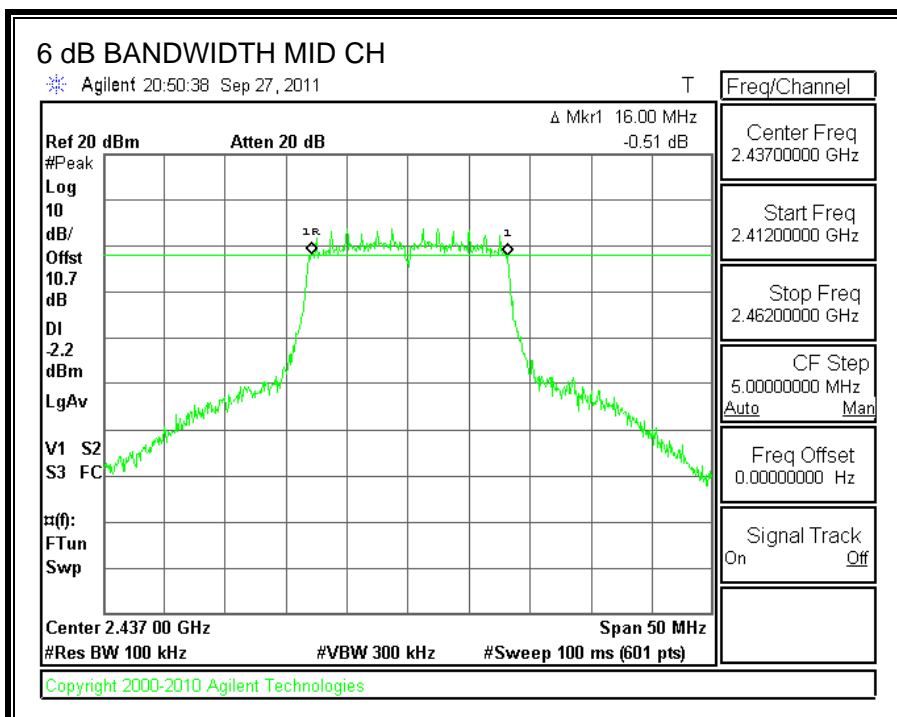
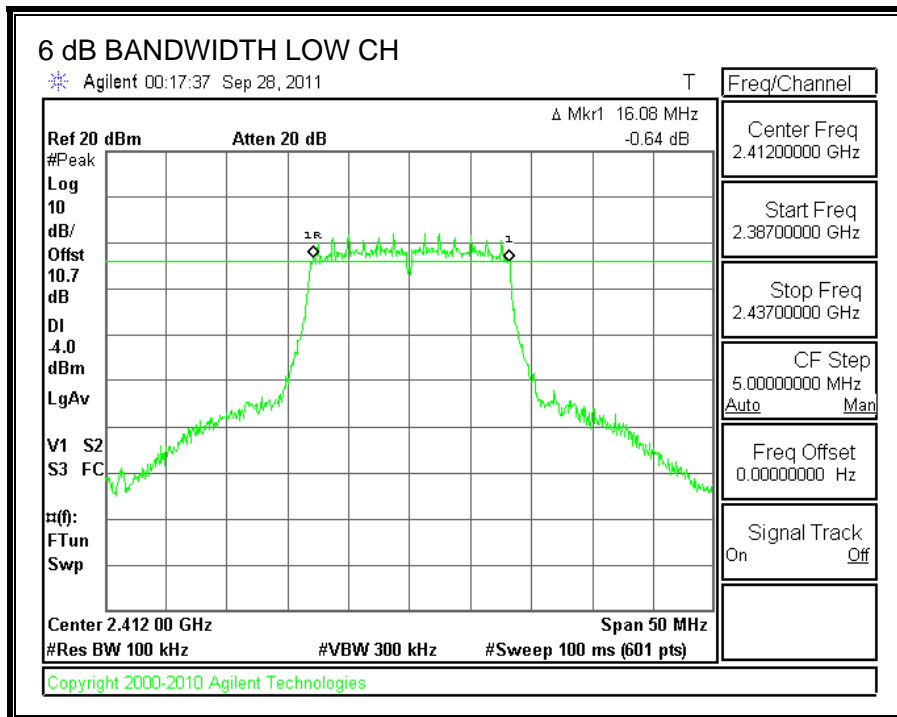
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

#### RESULTS

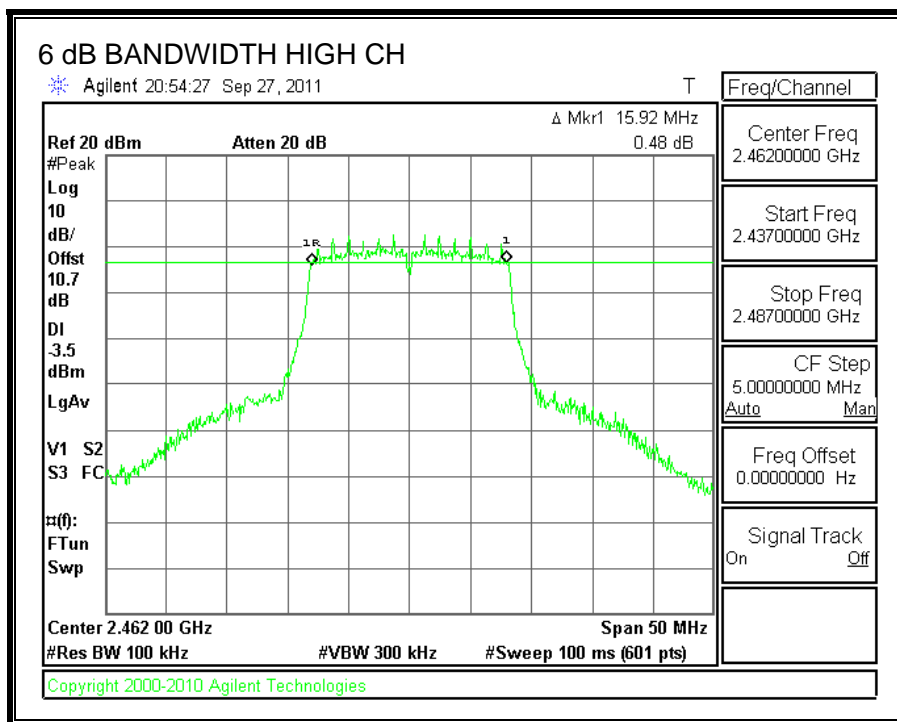
Type A

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.08	0.5
Middle	2437	16.00	0.5
High	2462	15.92	0.5

**6 dB BANDWIDTH**

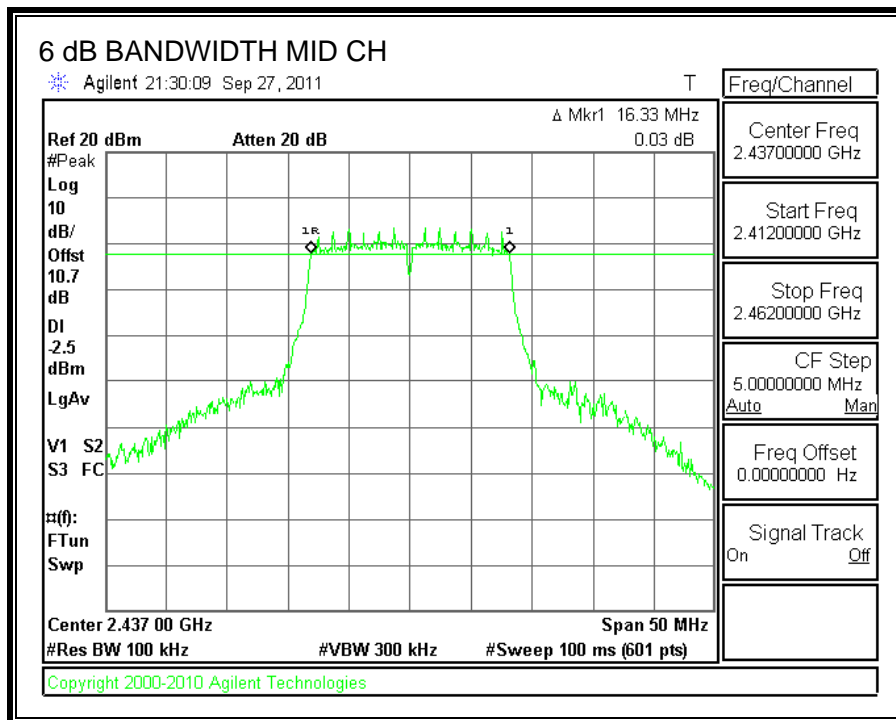




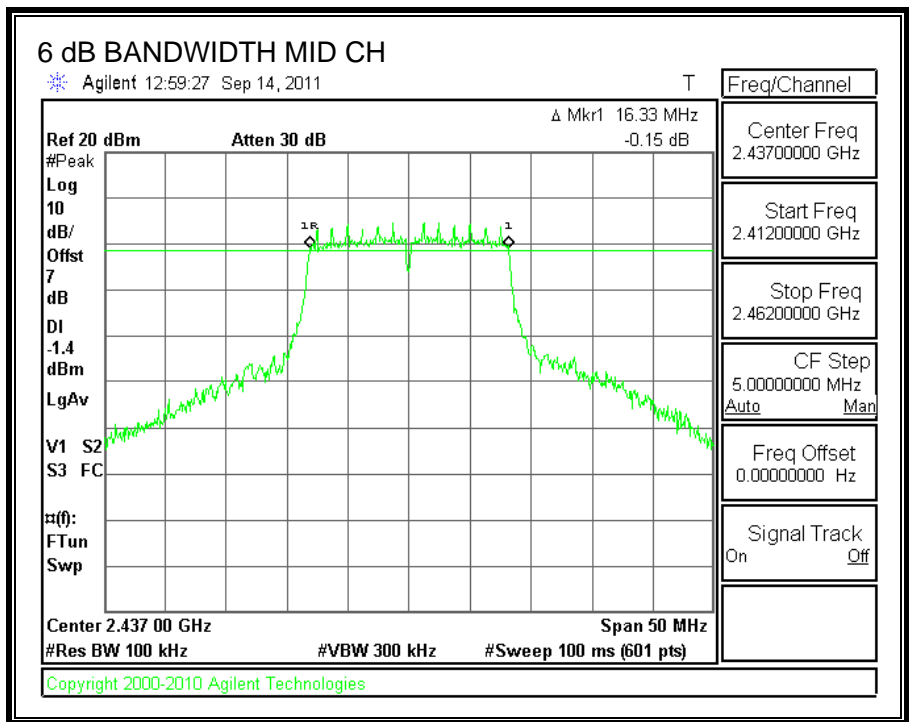


Type B

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Middle	2437	16.33	0.5



Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Middle	2437	16.33	0.5



## 7.2.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

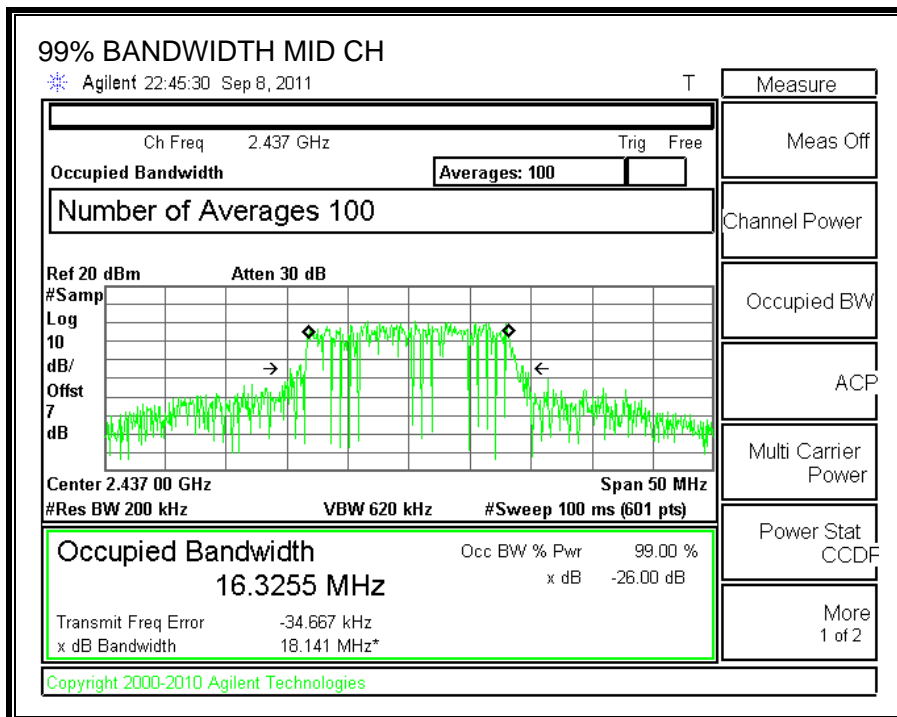
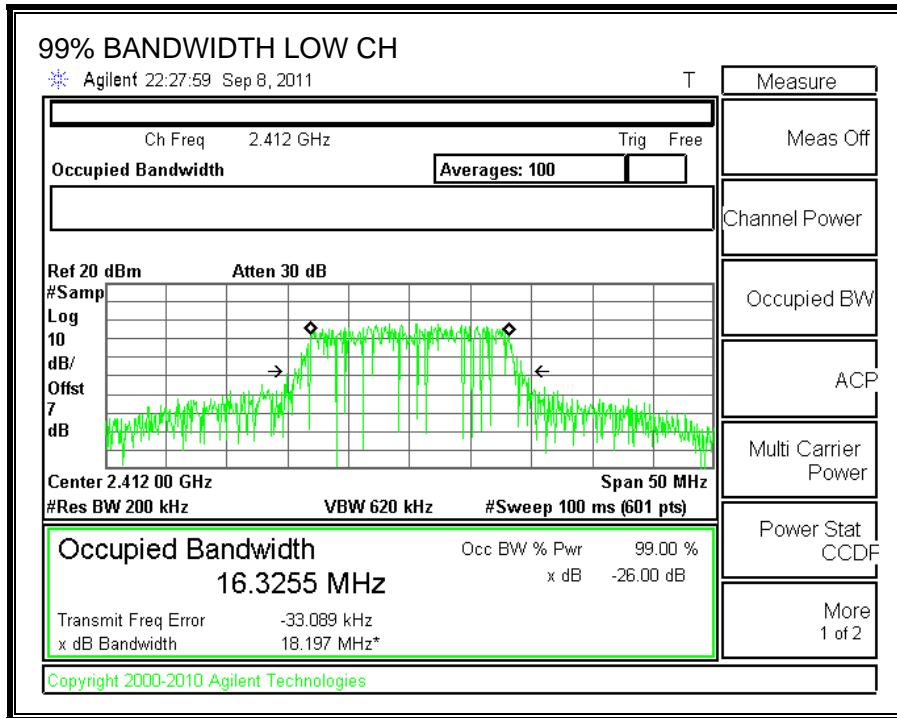
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

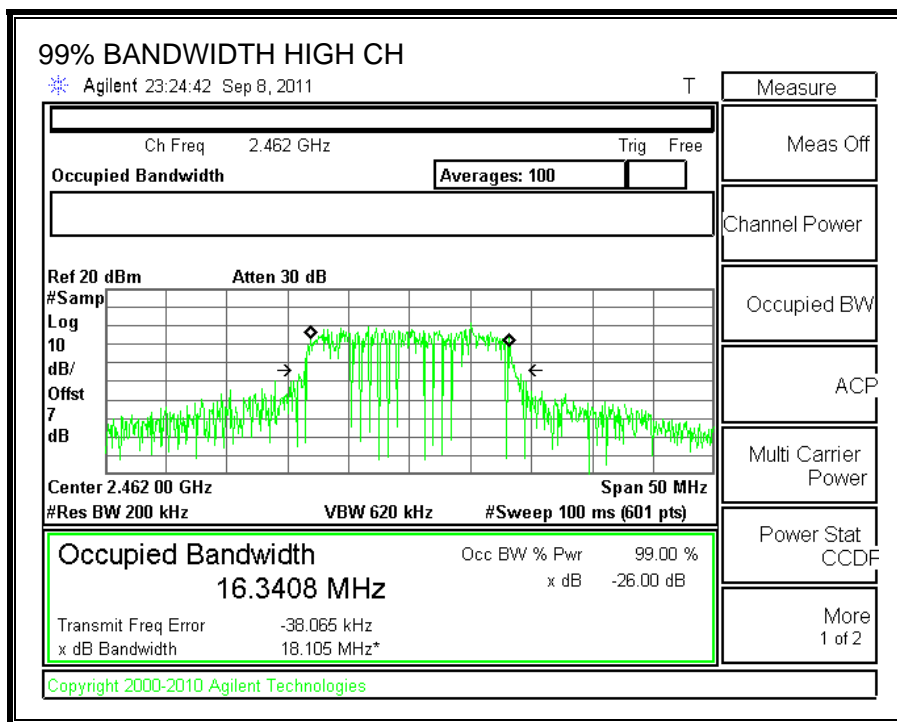
### RESULTS

Type A

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3255
Middle	2437	16.3255
High	2462	16.3408

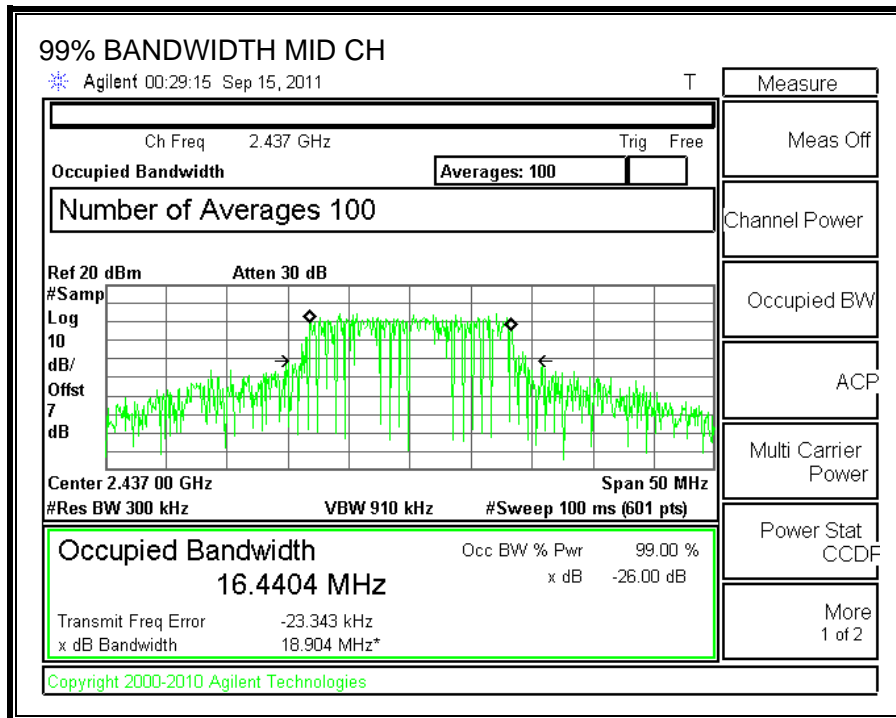
**99% BANDWIDTH**





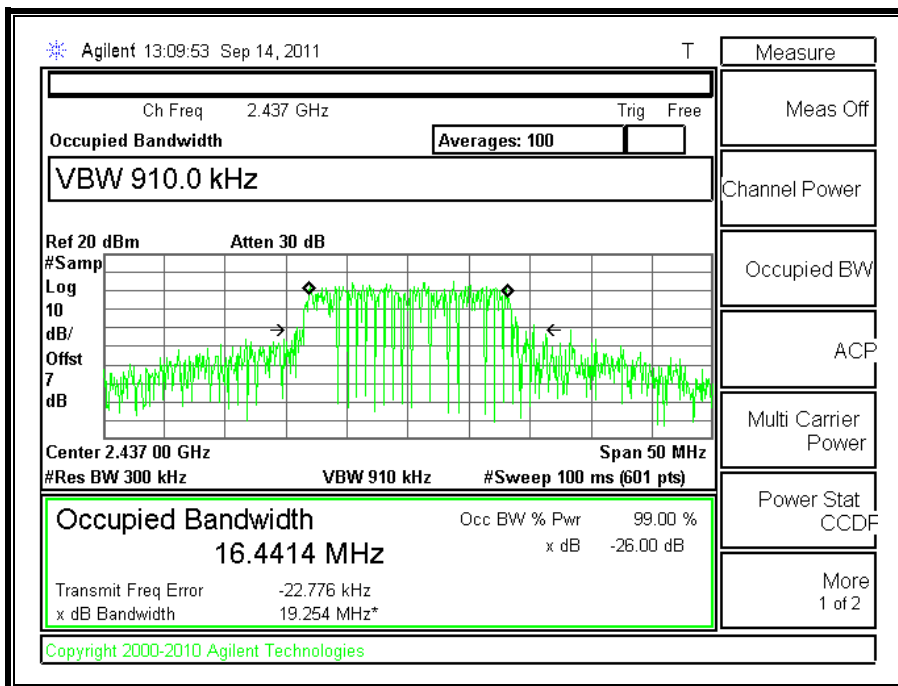
Type B

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	16.4404



Type C

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	16.4414





### 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

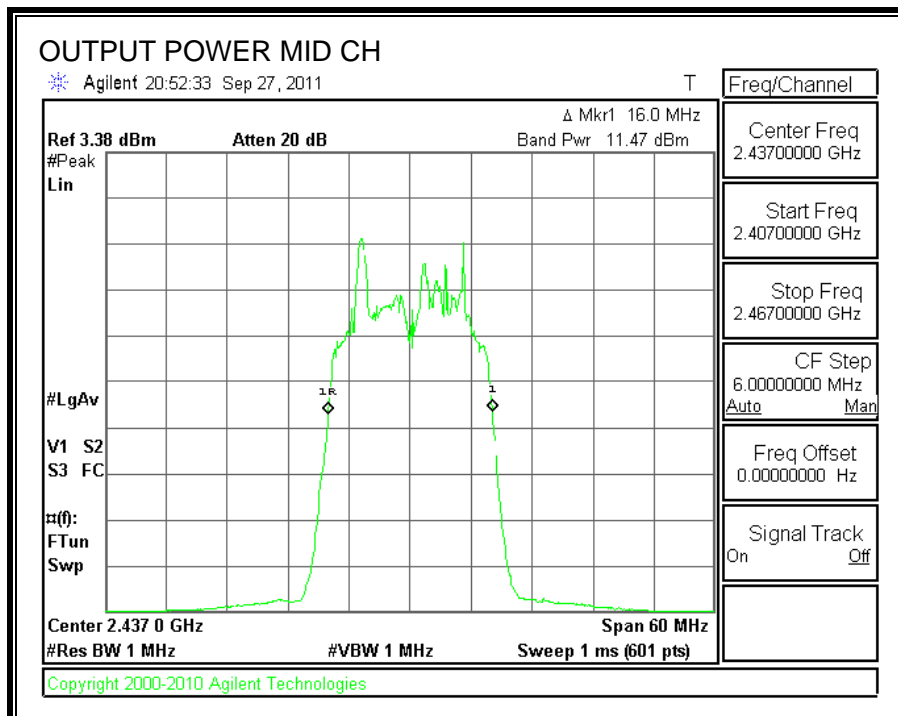
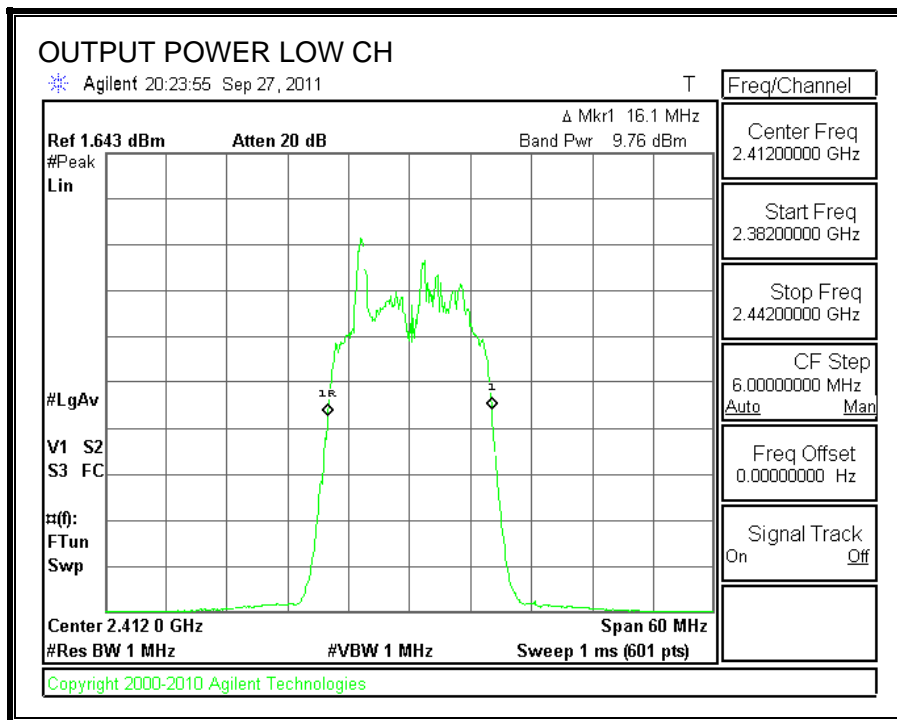
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

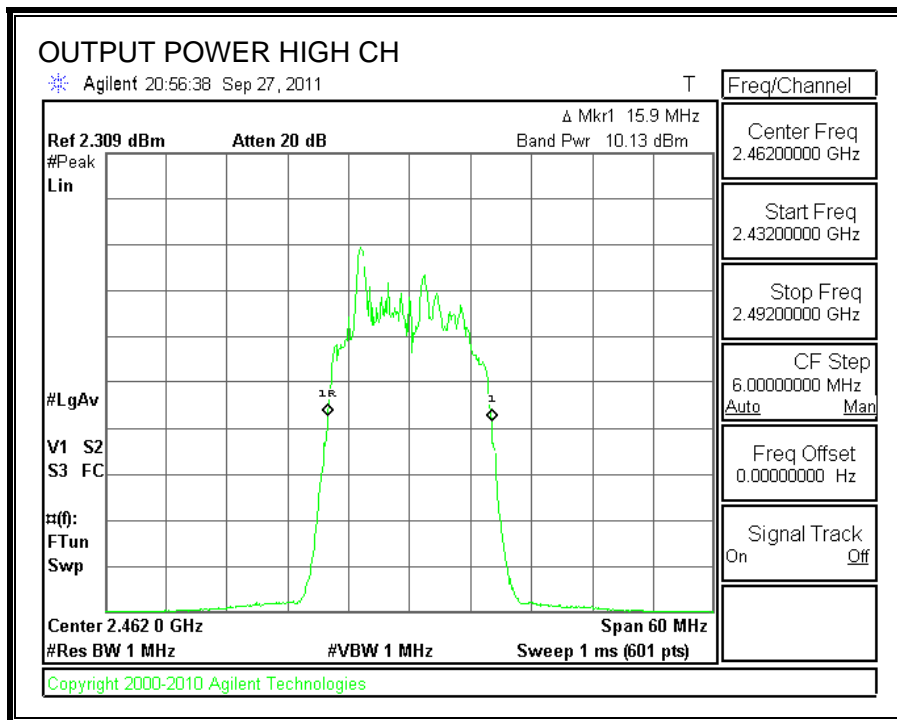
#### RESULTS

Type A:

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	9.76	10.7	20.46	30	-9.54
Middle	2437	11.47	10.7	22.17	30	-7.83
High	2462	10.13	10.7	20.83	30	-9.17

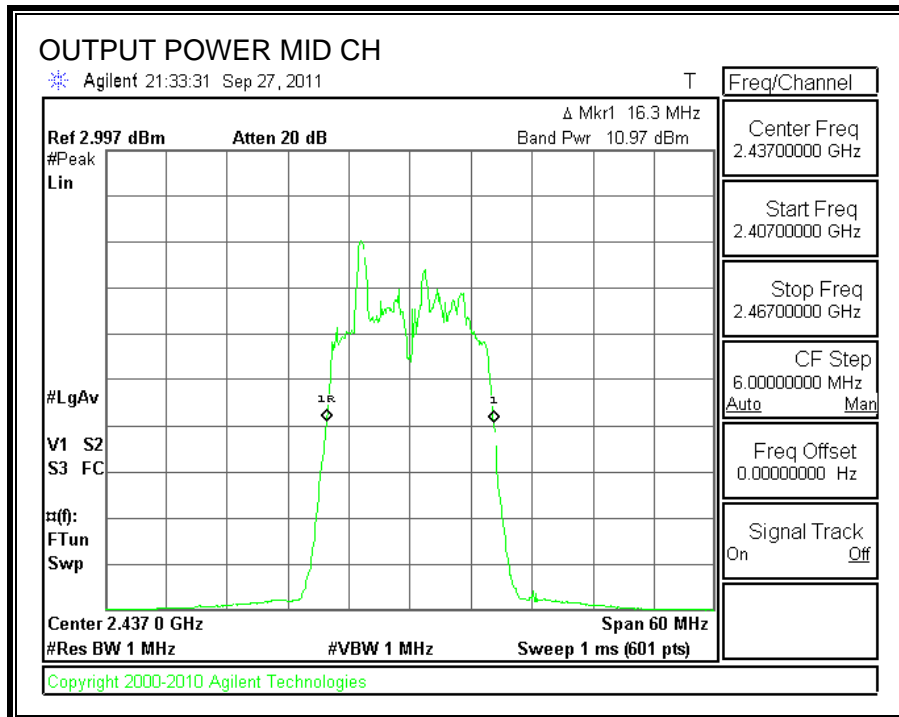
**OUTPUT POWER**





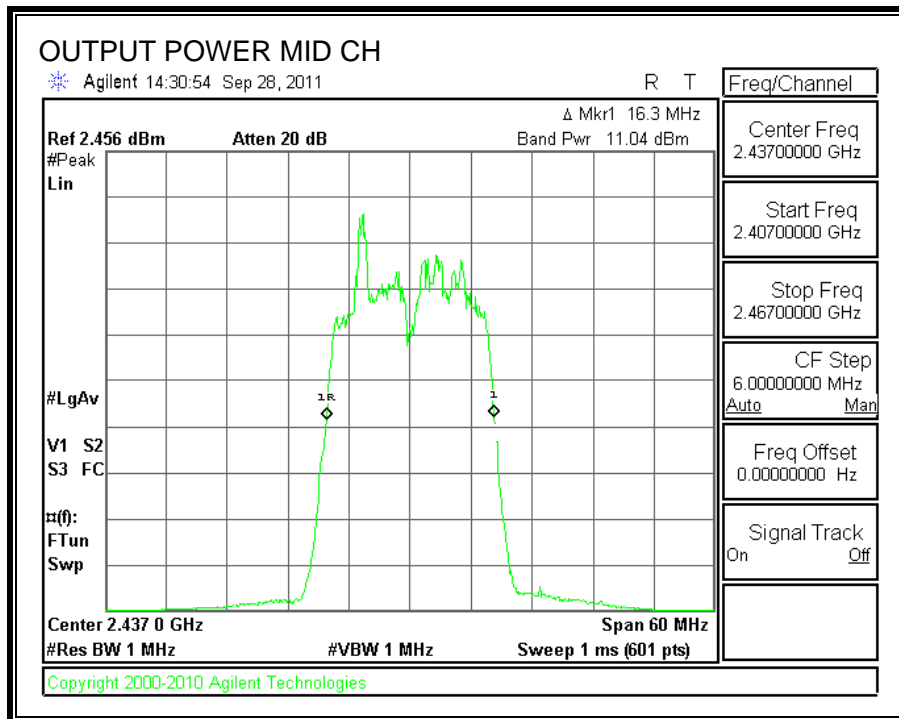
**Type B:**

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	10.97	10.7	21.67	30	-8.33



**Type C:**

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	11.04	10.7	21.74	30	-8.26



## 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 10.7dB (including 10 dB pad and .7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### Type A

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.58
Middle	2437	14.50
High	2462	13.08

#### Type B

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.53
Middle	2437	14.12
High	2462	13.18

#### Type C

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.35
Middle	2437	13.85
High	2462	13.27

## 7.2.5. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

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

### TEST PROCEDURE

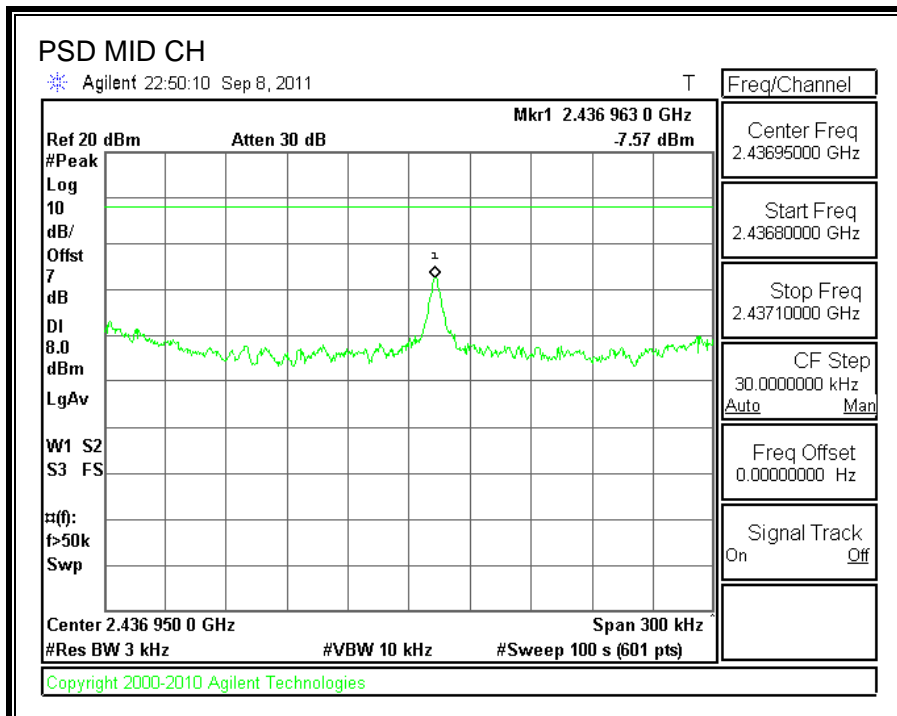
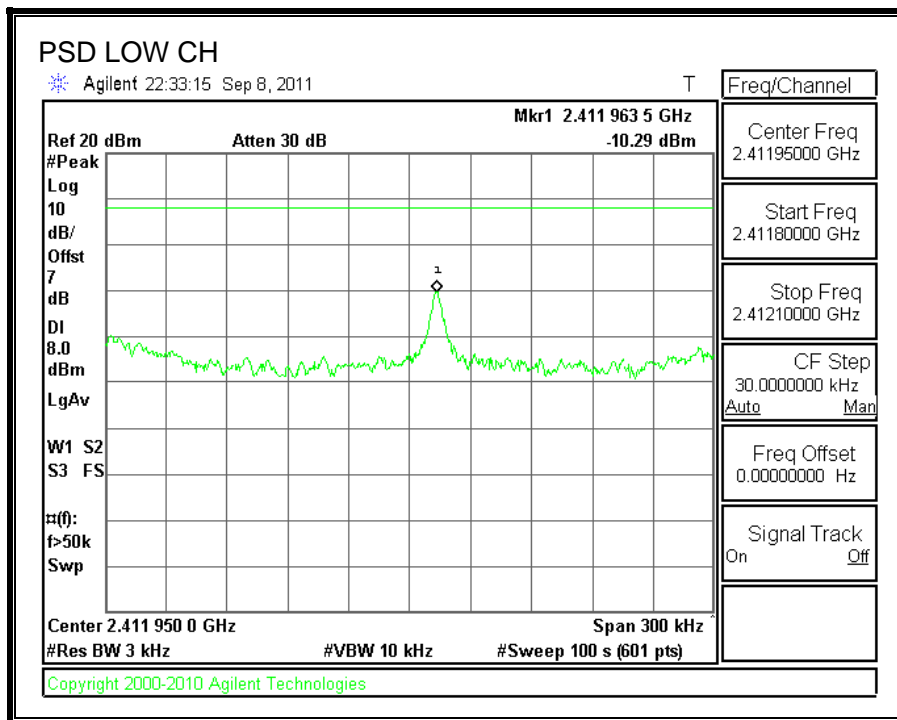
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### RESULTS

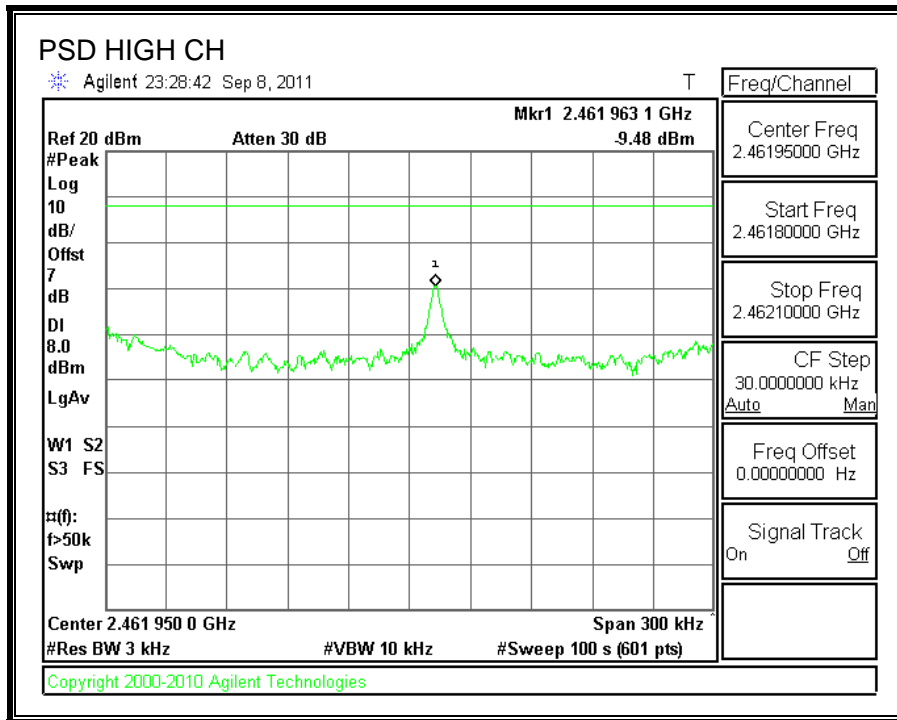
Type A

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.29	8	-18.29
Middle	2437	-7.57	8	-15.57
High	2462	-9.48	8	-17.48

**POWER SPECTRAL DENSITY**

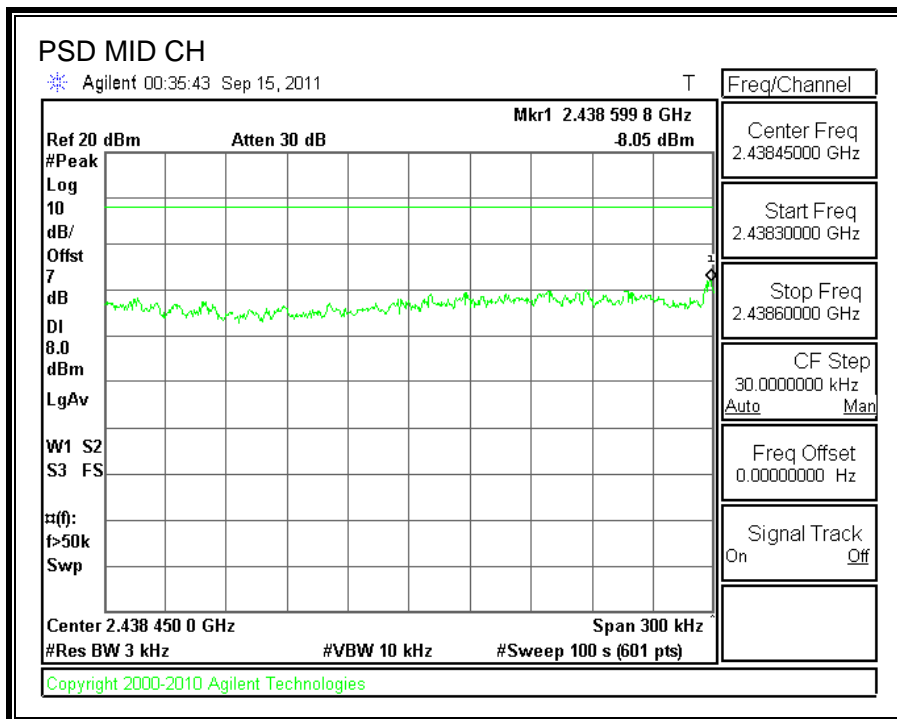






Type B

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-8.02	8	-16.02





## **7.2.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

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

### **TEST PROCEDURE**

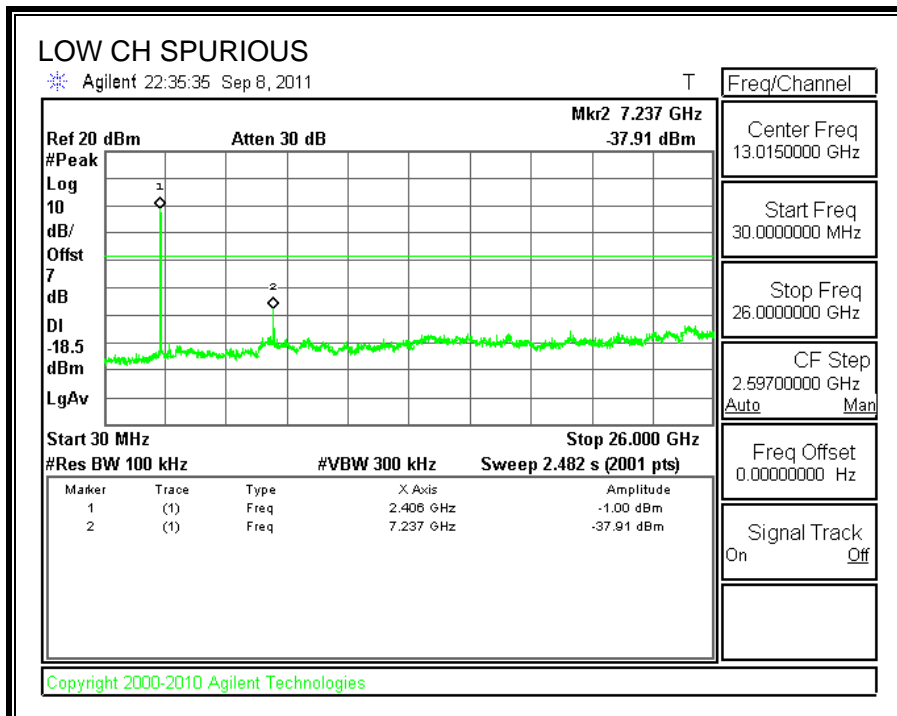
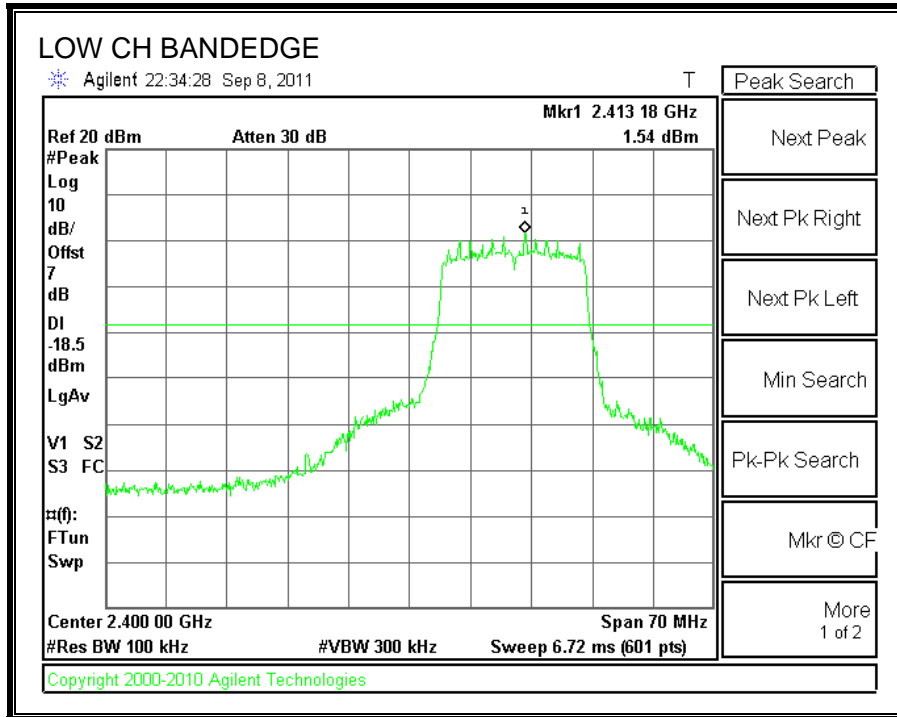
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

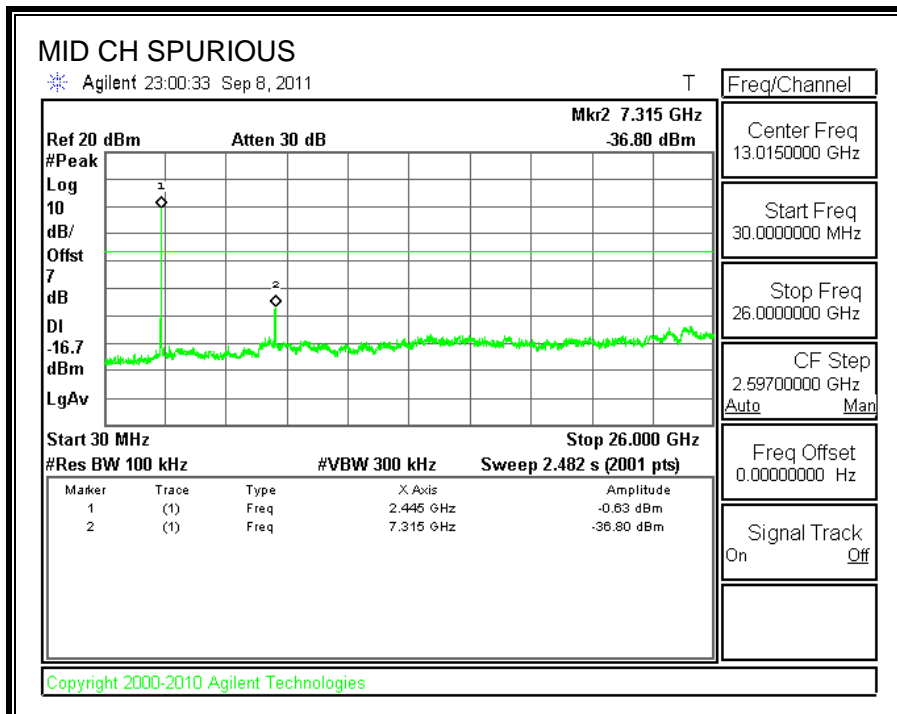
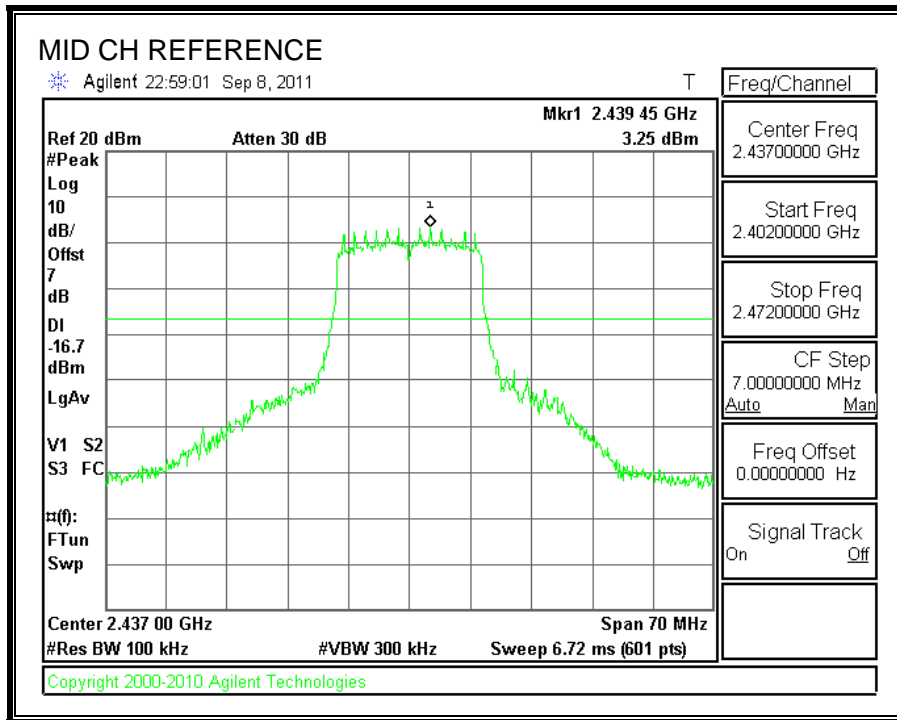
**RESULTS**

Type A

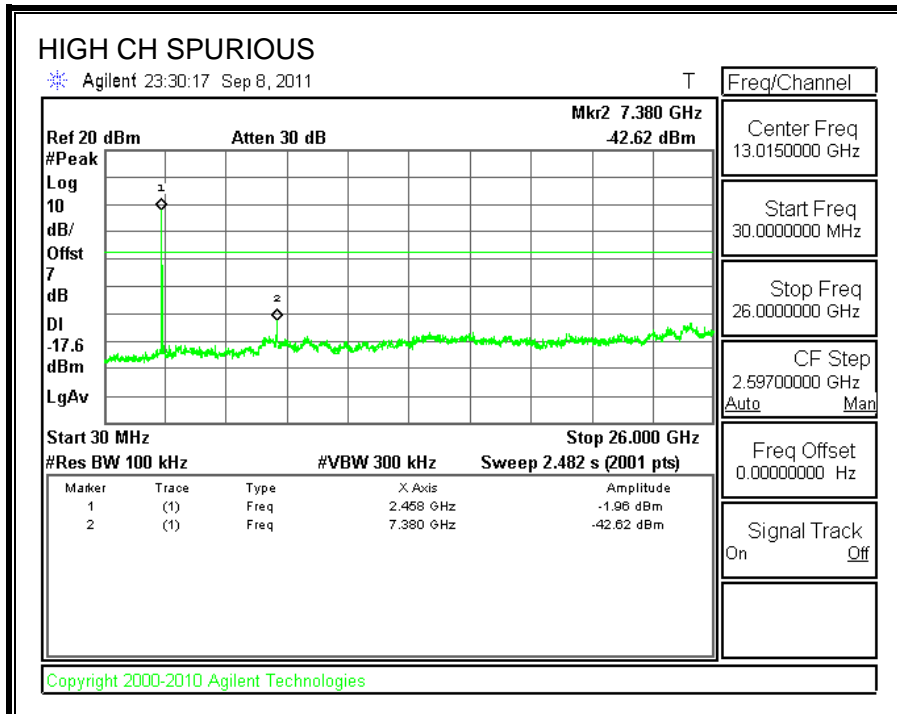
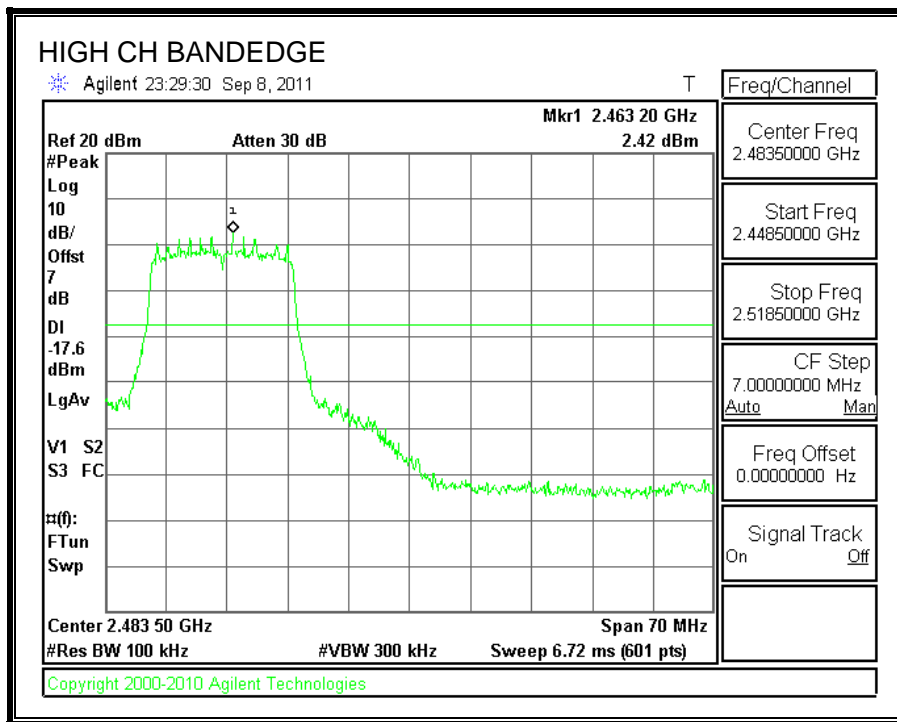
**SPURIOUS EMISSIONS, LOW CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**

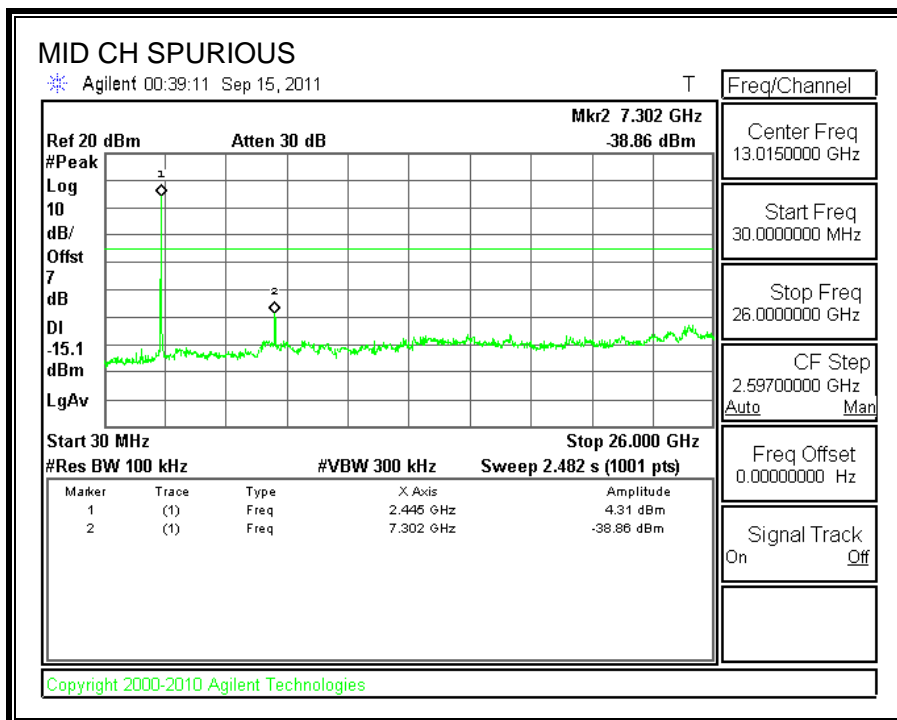
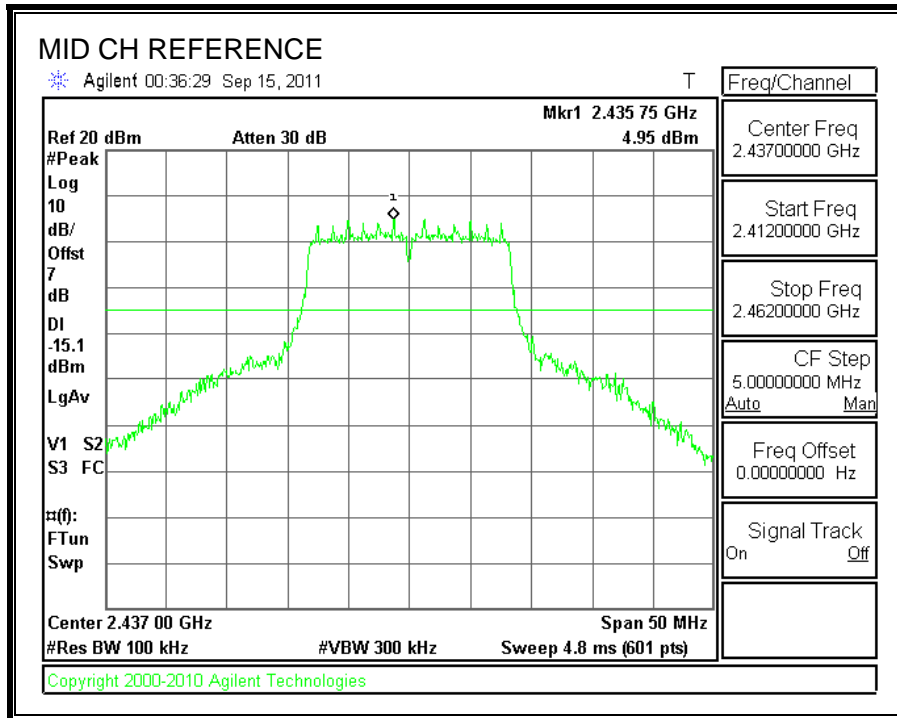


**SPURIOUS EMISSIONS, HIGH CHANNEL**



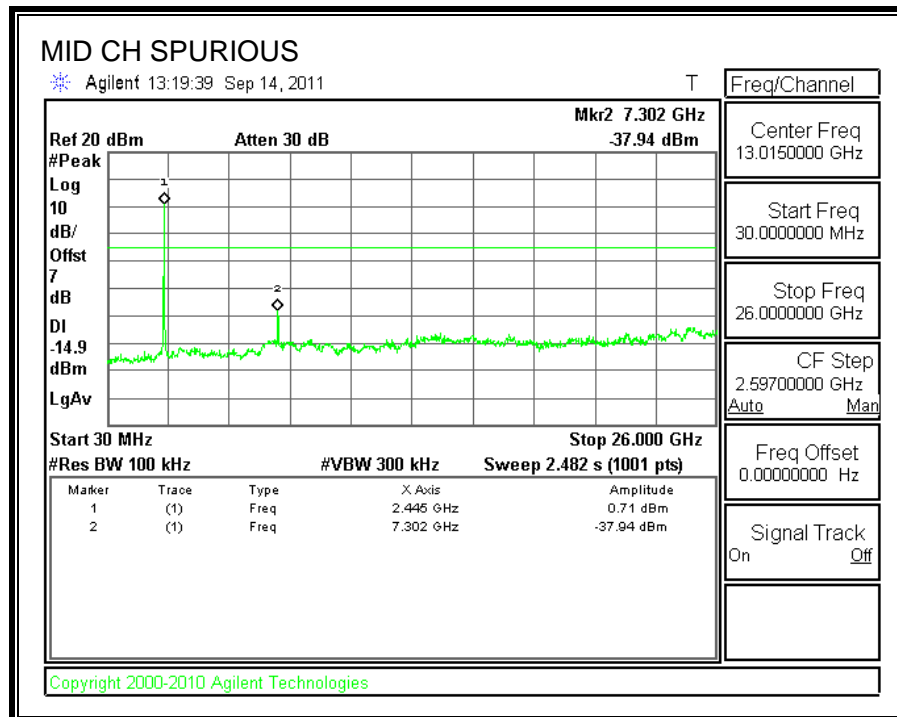
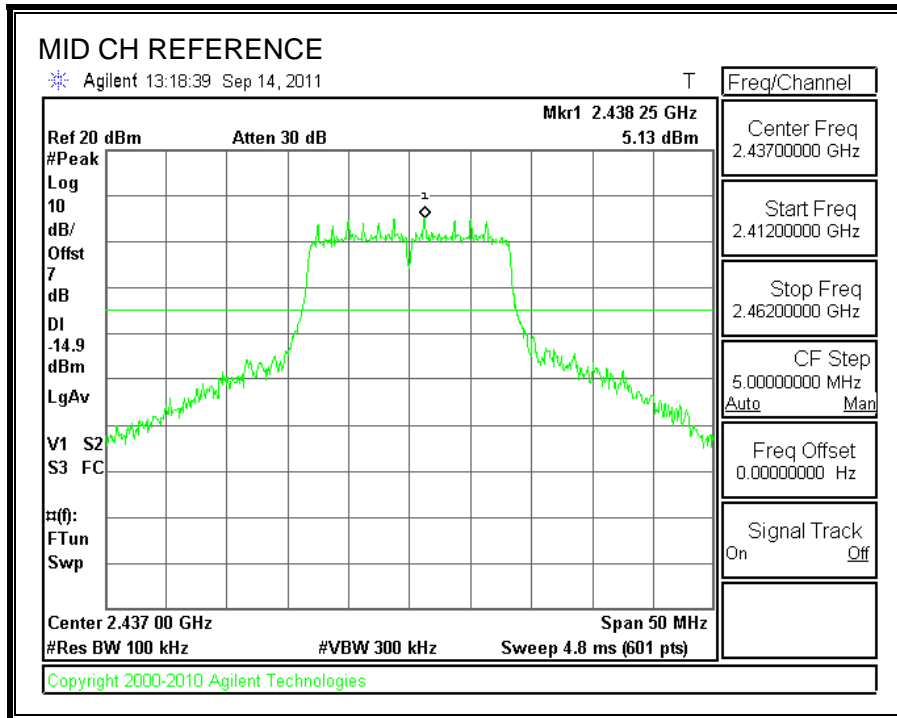
Type B

**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, MID CHANNEL**



### 7.3. 802.11HT 20 MODE IN THE 2.4 GHz BAND

#### 7.3.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

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

##### TEST PROCEDURE

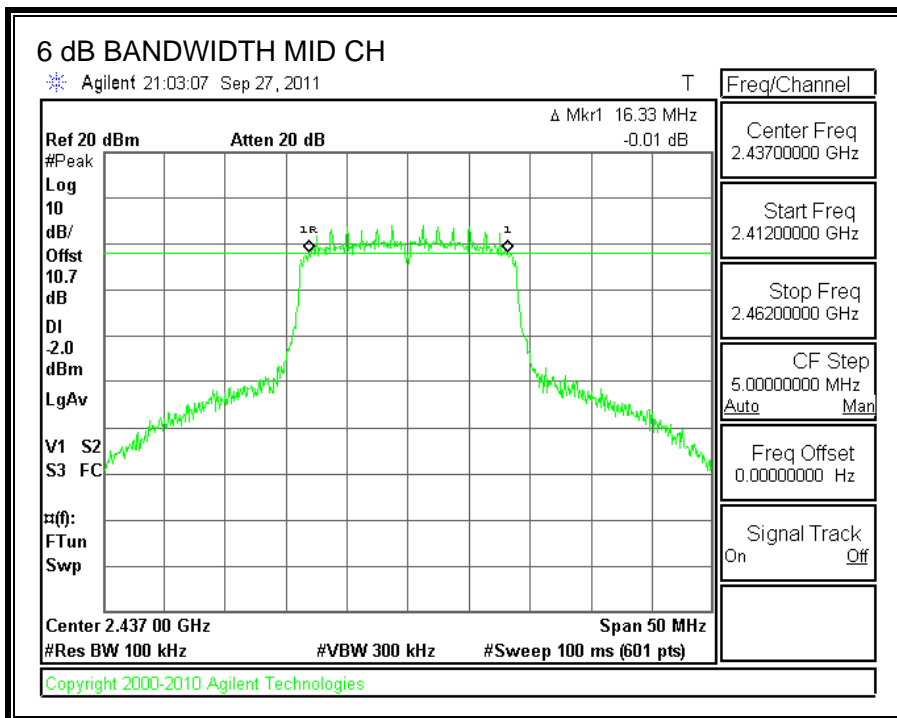
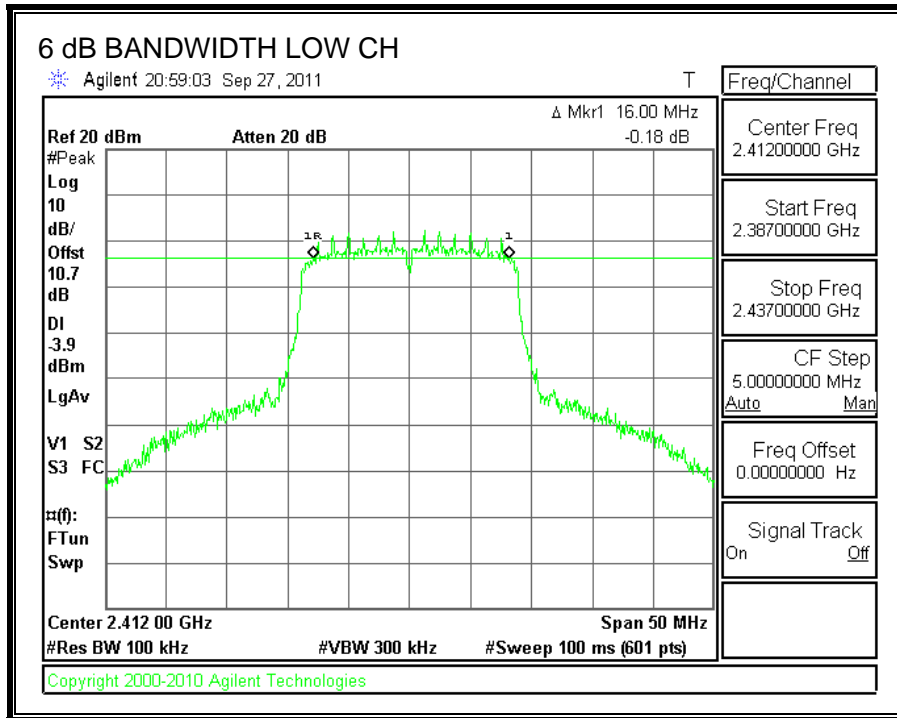
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

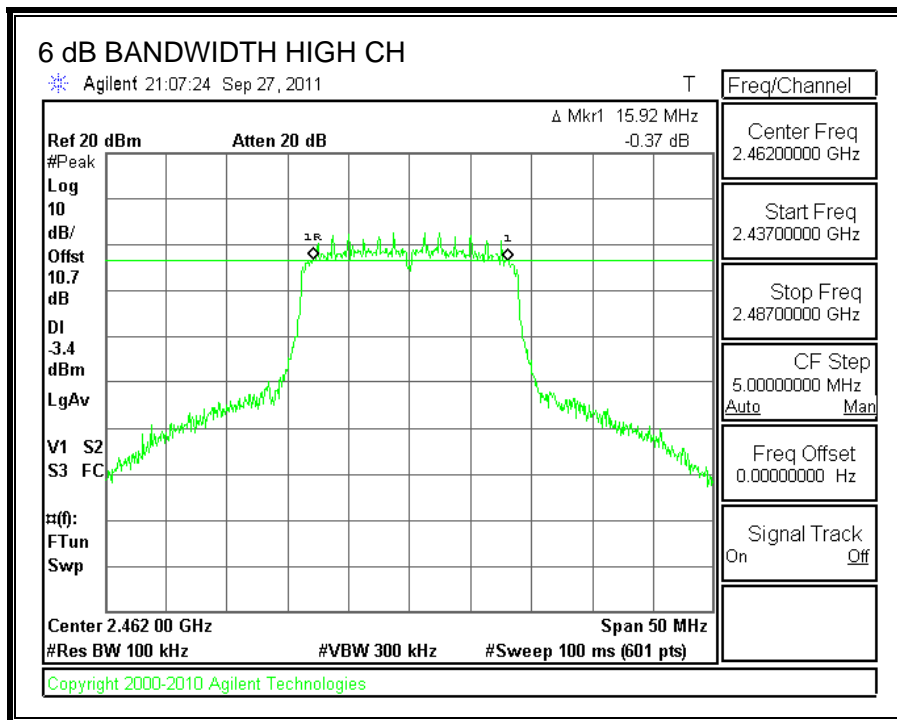
##### RESULTS

Type A

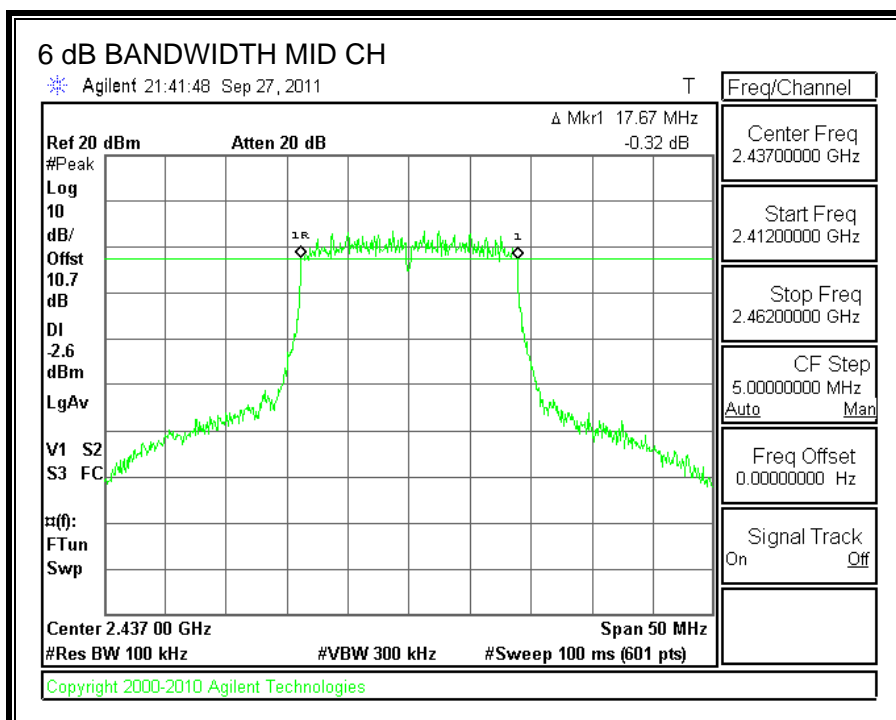
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.00	0.5
Middle	2437	16.33	0.5
High	2462	15.92	0.5

**6 dB BANDWIDTH**

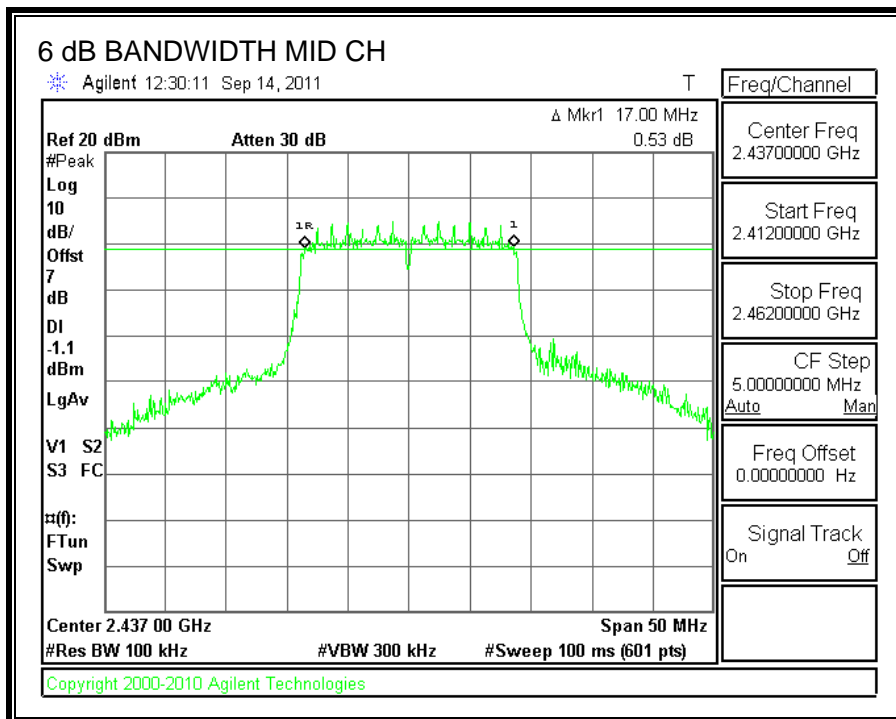




Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Middle	2437	17.67	0.5



Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Middle	2437	17.00	0.5



### 7.3.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

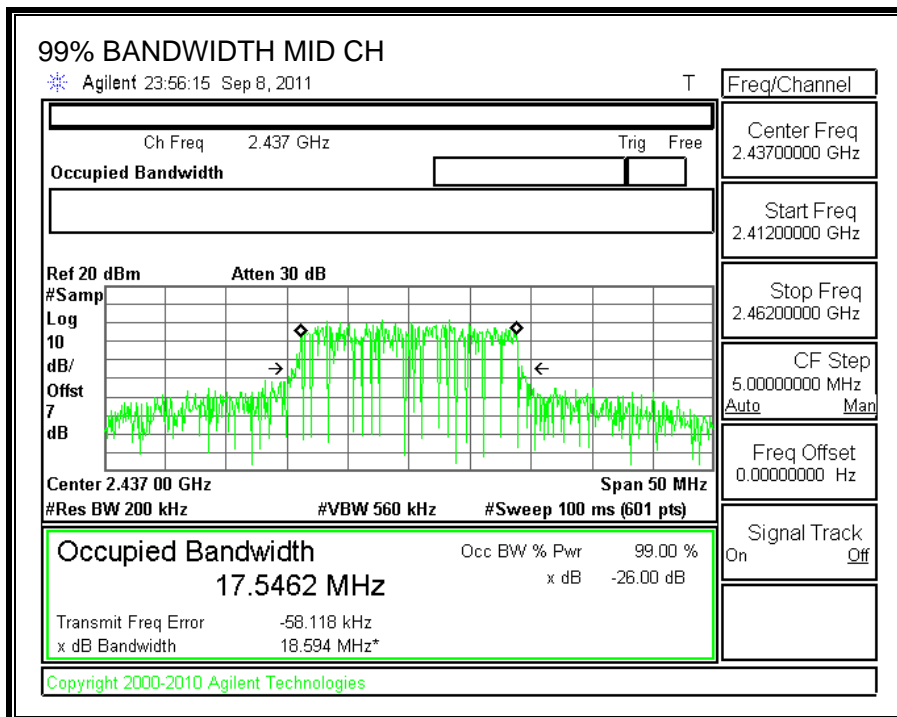
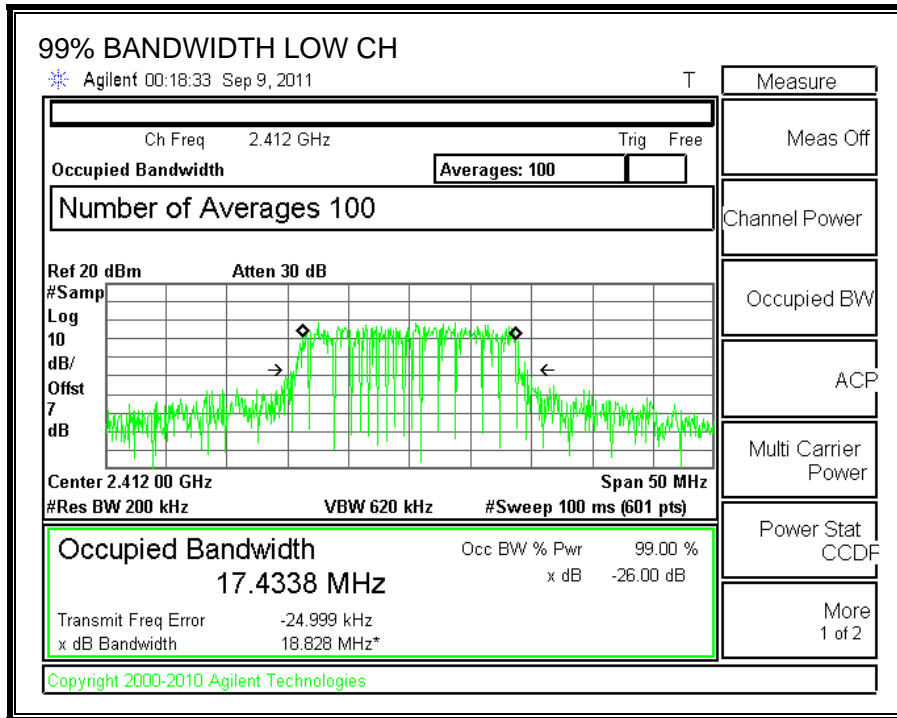
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

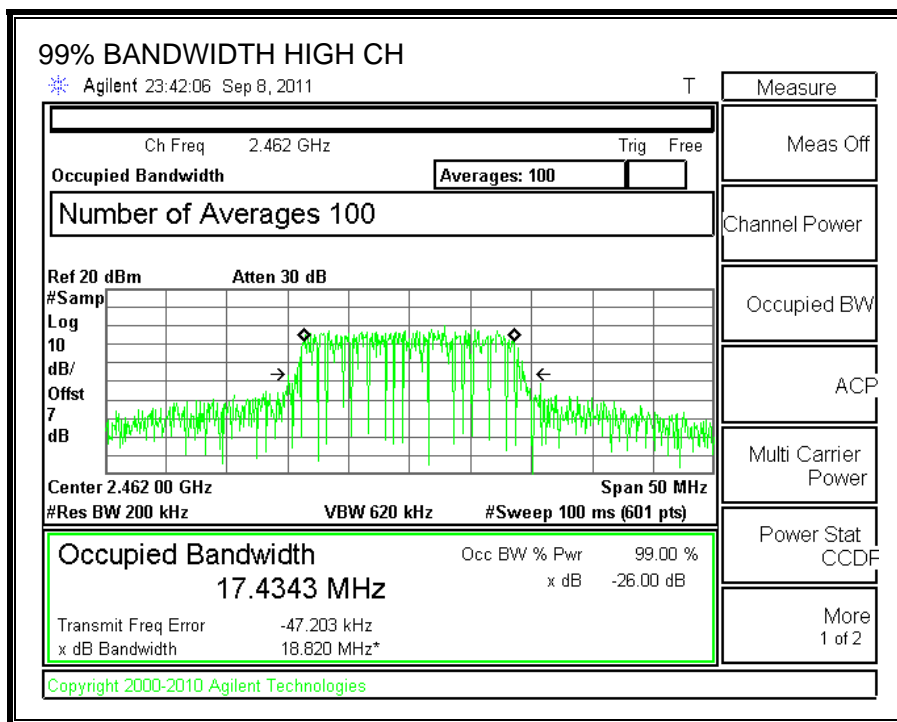
Type A

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.4338
Middle	2437	17.5462
High	2462	17.4343

**99% BANDWIDTH**



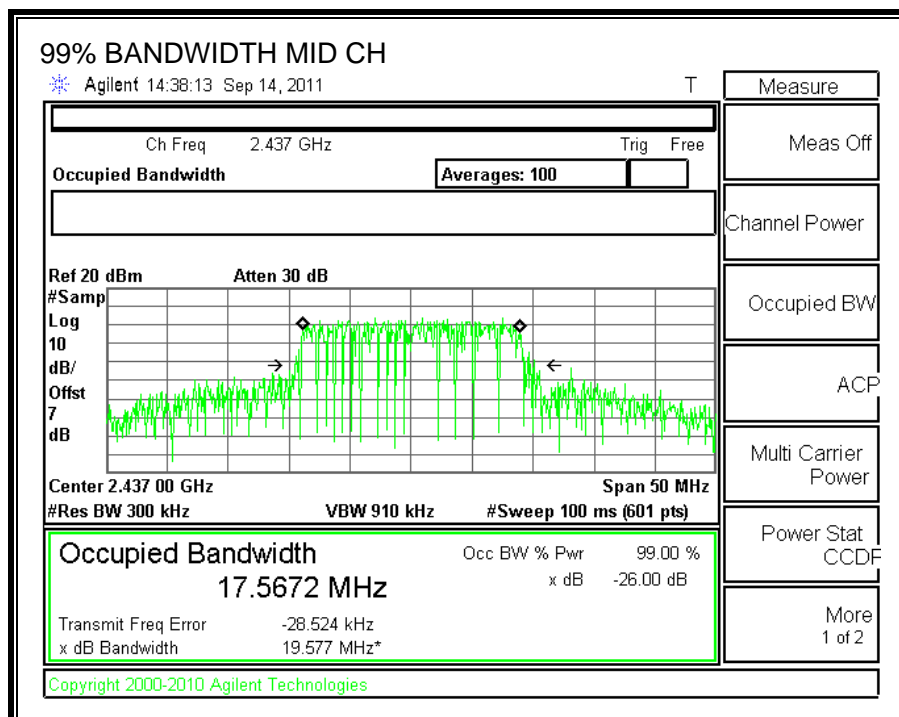




Type B

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	17.5620

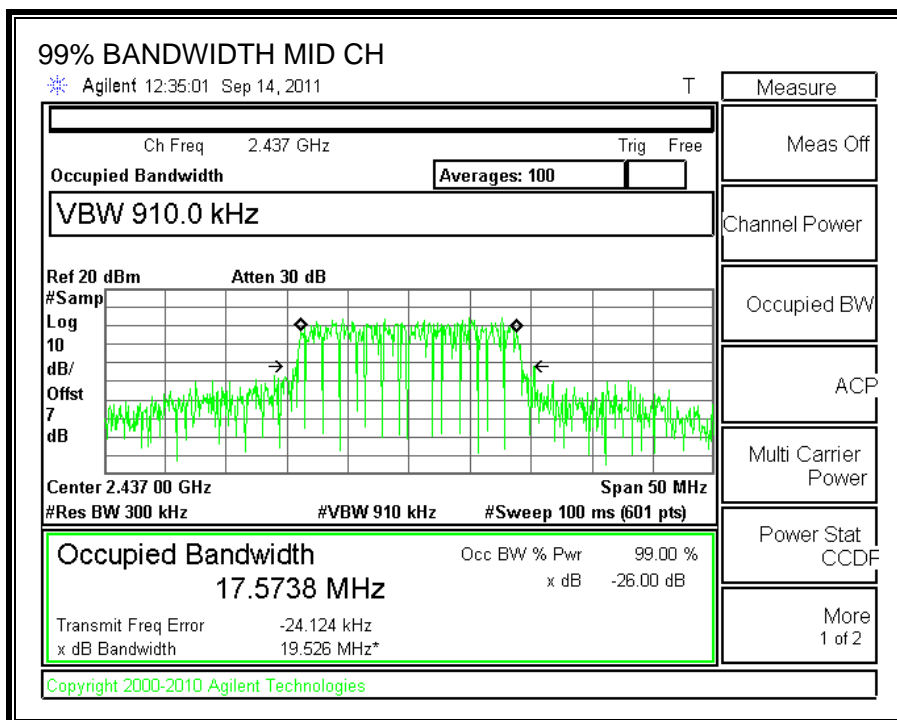
**99% BANDWIDTH**



Type C

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Middle	2437	17.5738

**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

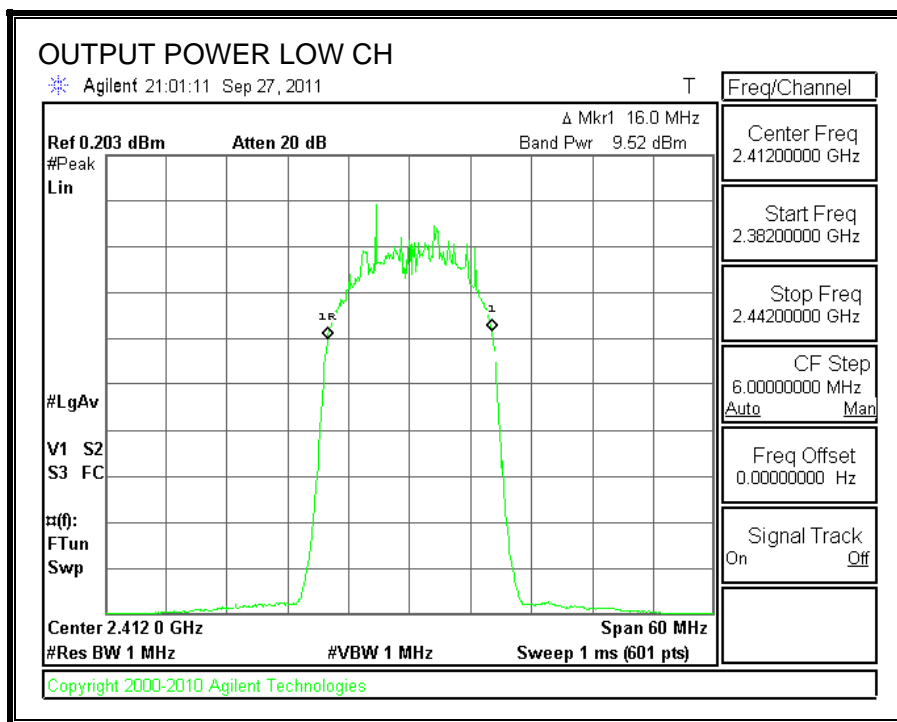
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

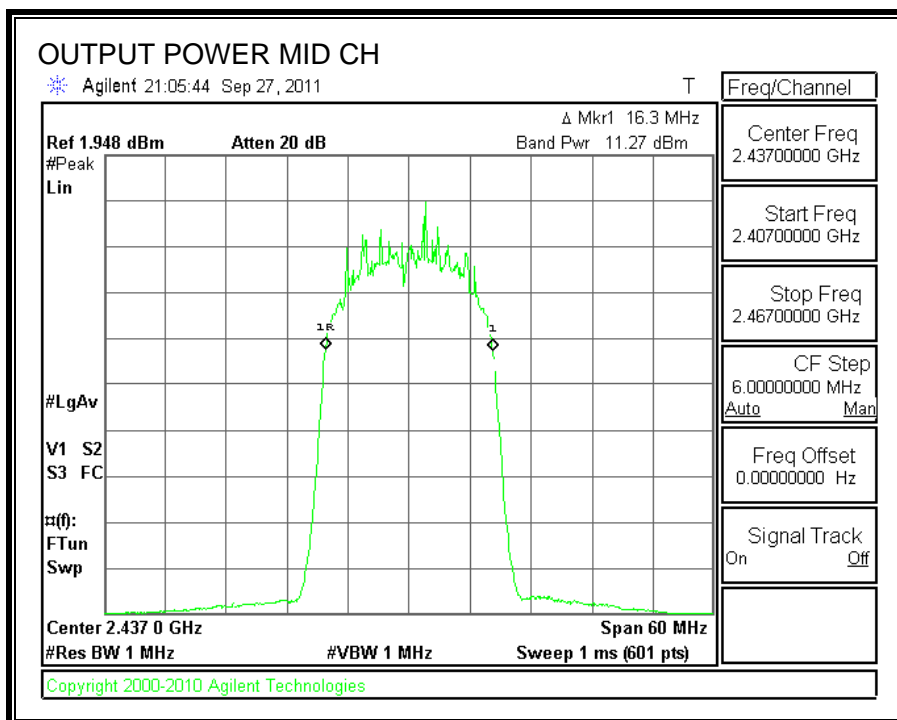
#### RESULTS

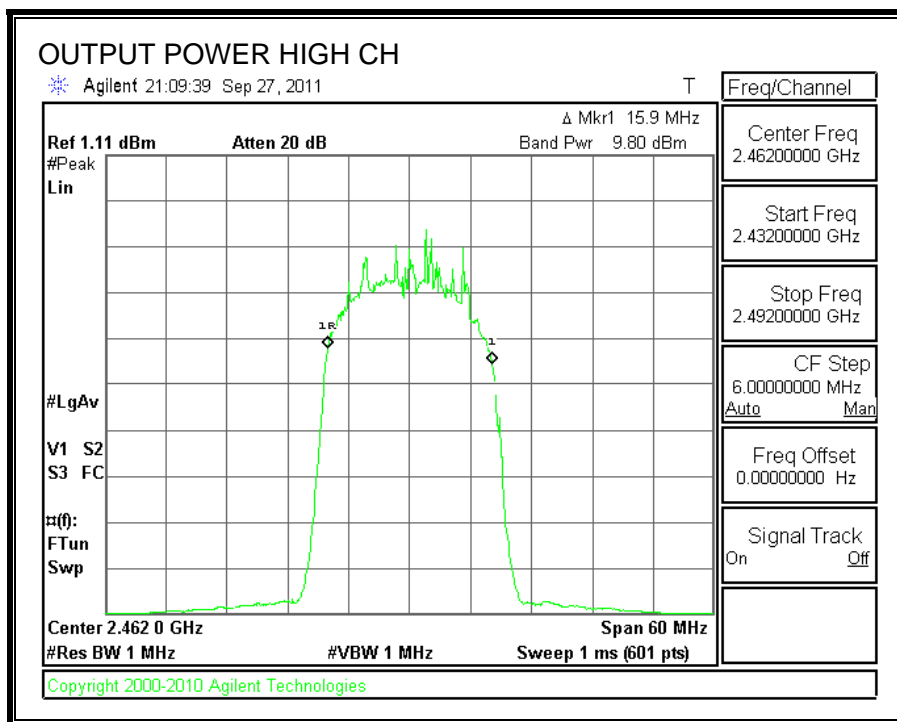
Type A:

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	9.52	10.7	20.22	30	-9.78
Middle	2437	11.27	10.7	21.97	30	-8.03
High	2462	9.80	10.7	20.50	30	-9.50

**OUTPUT POWER**

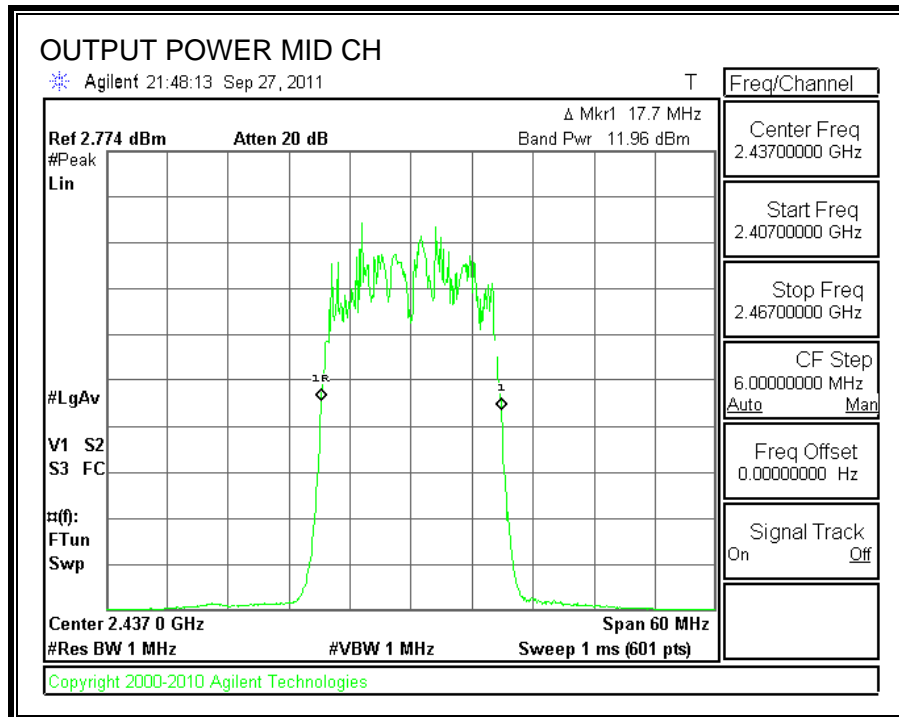






**Type B:**

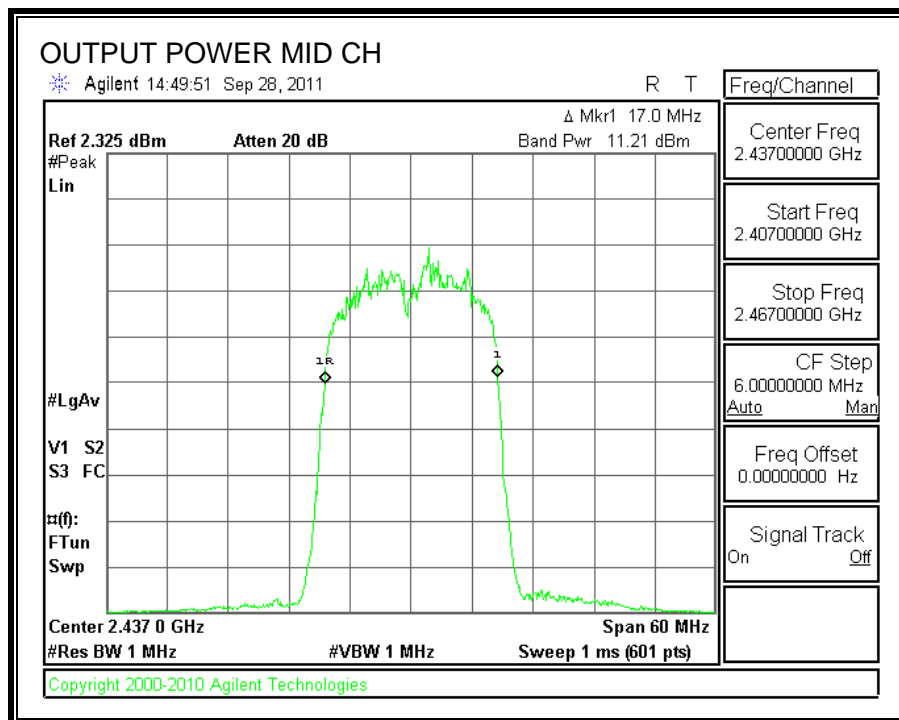
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	11.96	10.7	22.66	30	-7.34





**Type C:**

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	11.21	10.7	21.91	30	-8.09



### 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 7dB (including 6 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

##### Type A

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.28
Middle	2437	14.25
High	2462	12.97

##### Type B

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.50
Middle	2437	14.20
High	2462	13.60

##### Type C

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.53
Middle	2437	14.20
High	2462	13.24

### 7.3.5. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

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

#### TEST PROCEDURE

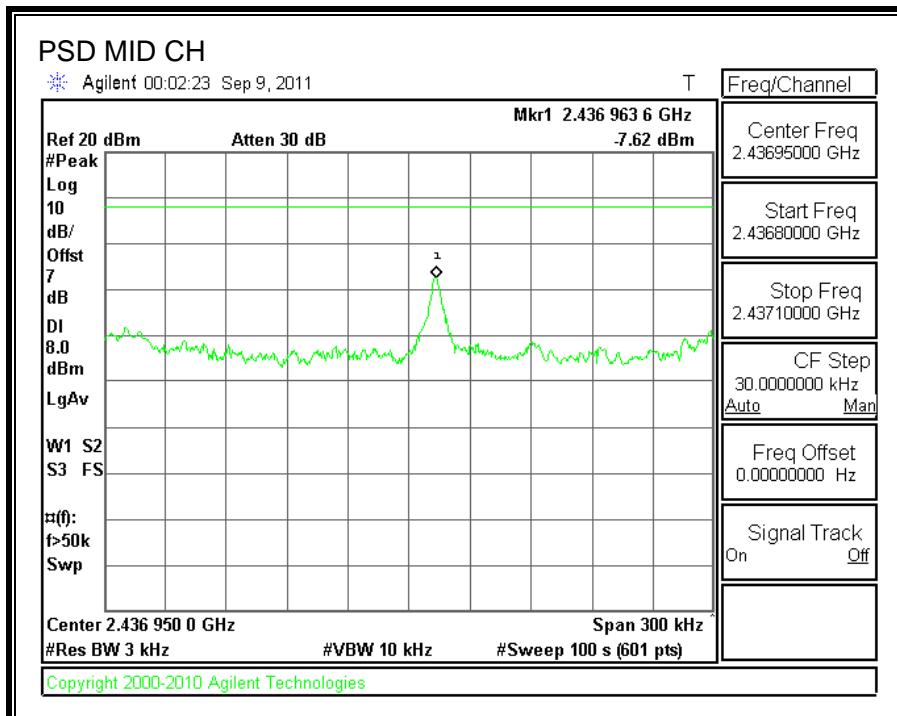
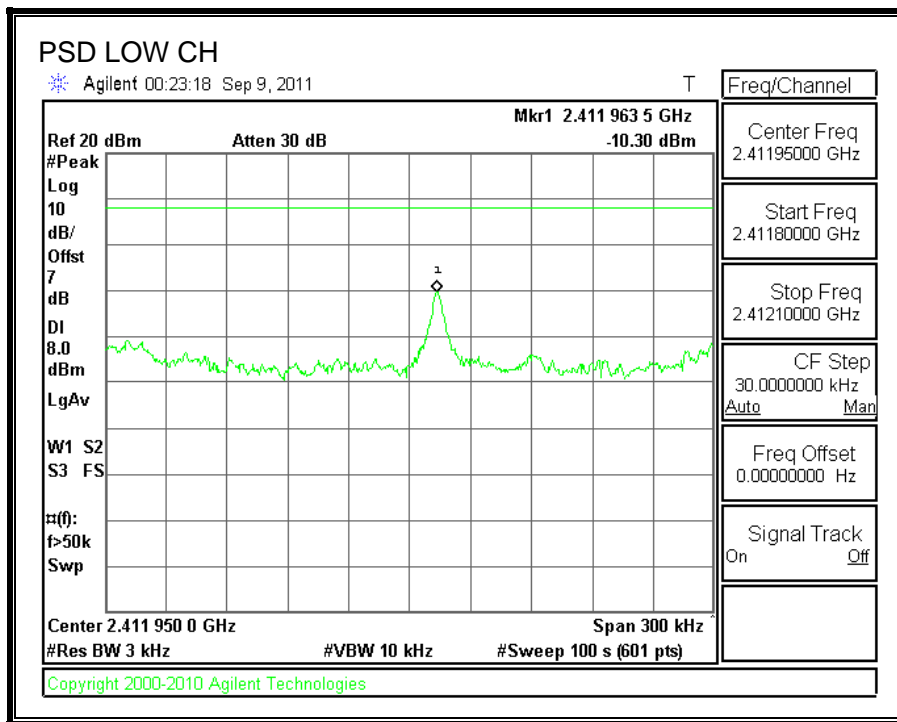
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

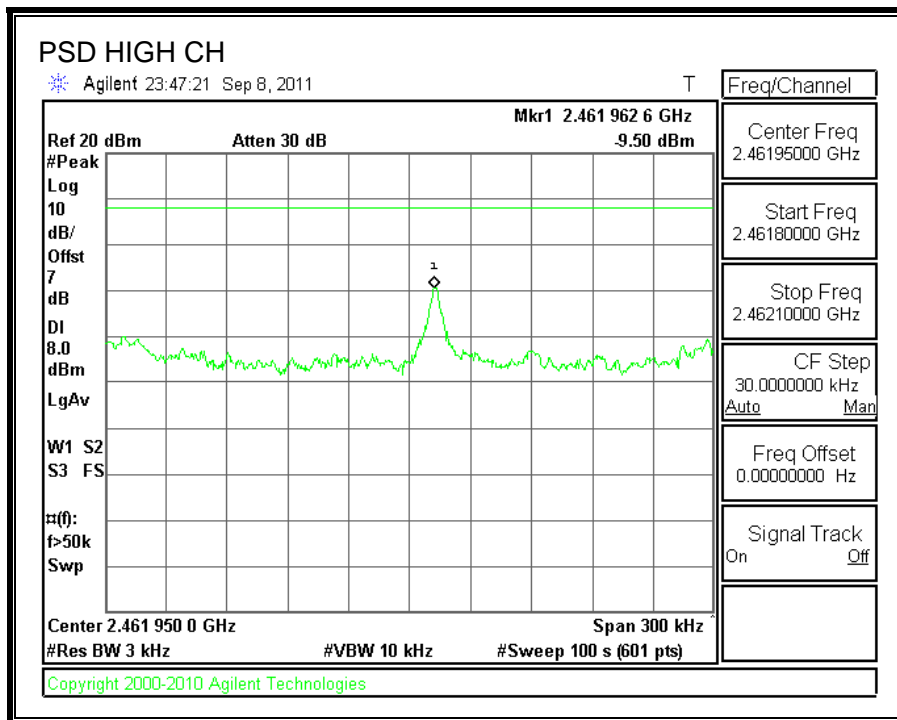
#### RESULTS

Type A

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.30	8	-18.30
Middle	2437	-7.62	8	-15.62
High	2462	-9.50	8	-17.50

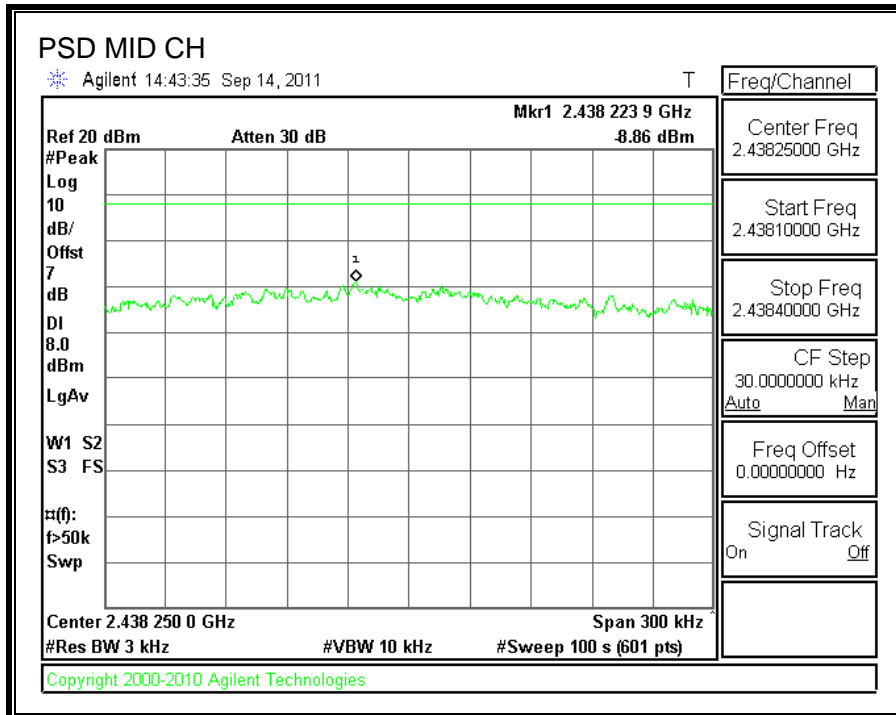
**POWER SPECTRAL DENSITY**





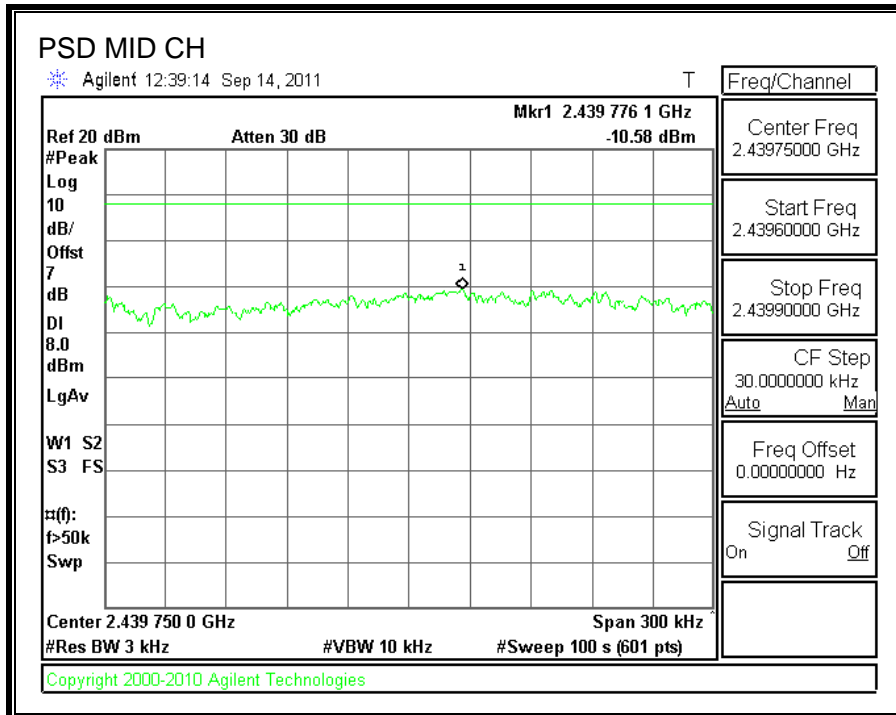
Type B

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-8.86	8	-16.86



Type C

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Middle	2437	-10.58	8	-18.58



### **7.3.6. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

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.

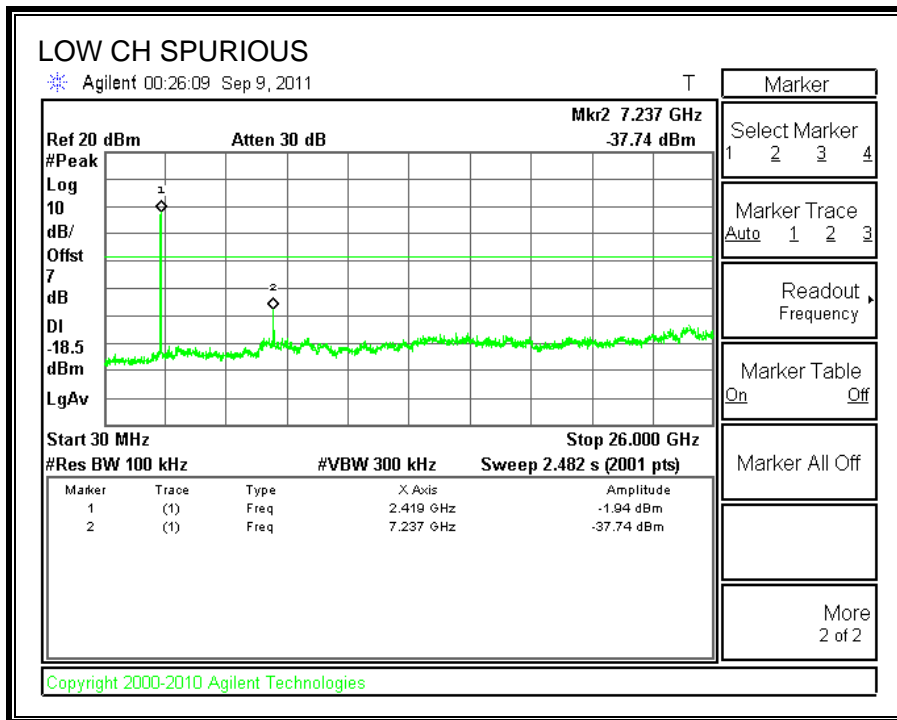
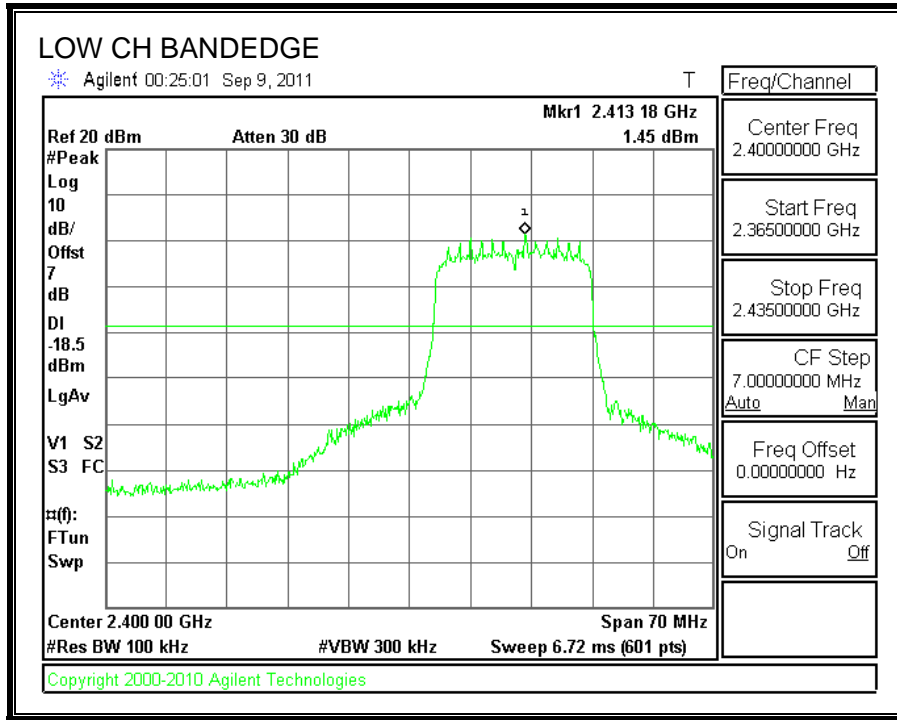
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.



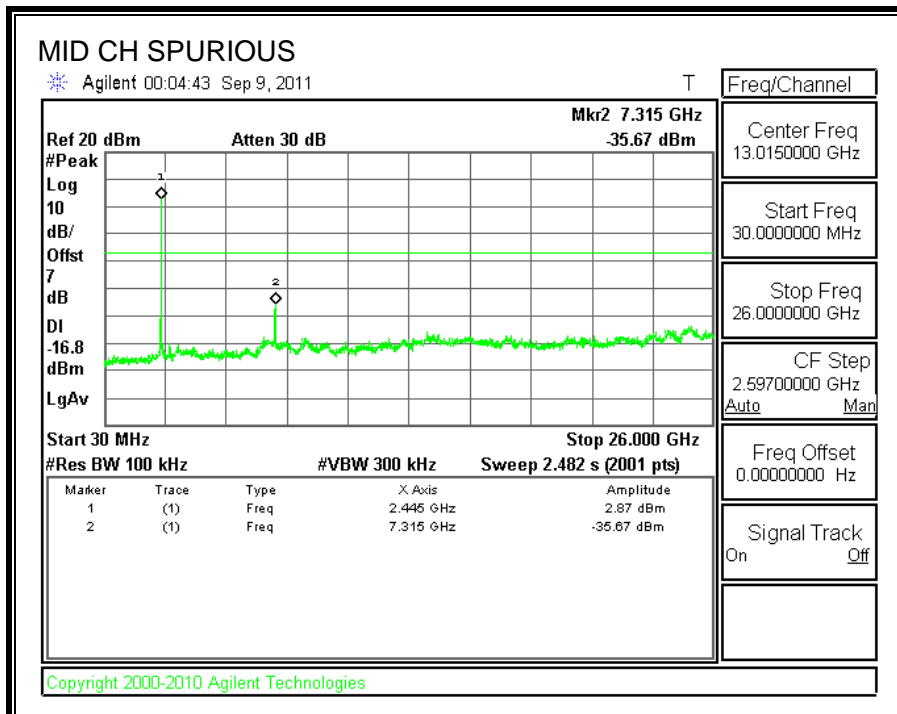
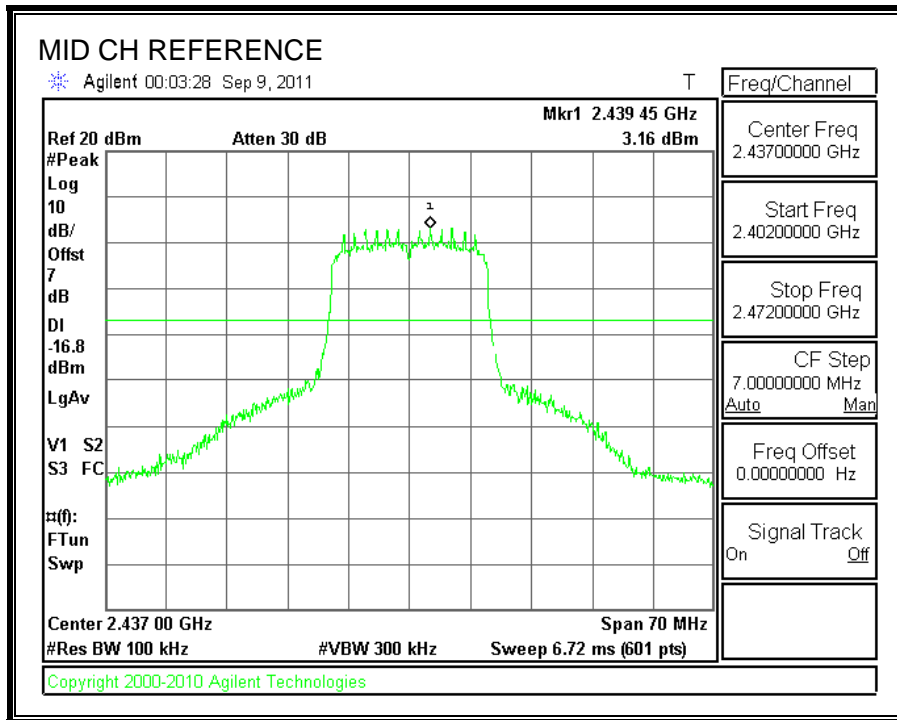
**RESULTS**

Type A

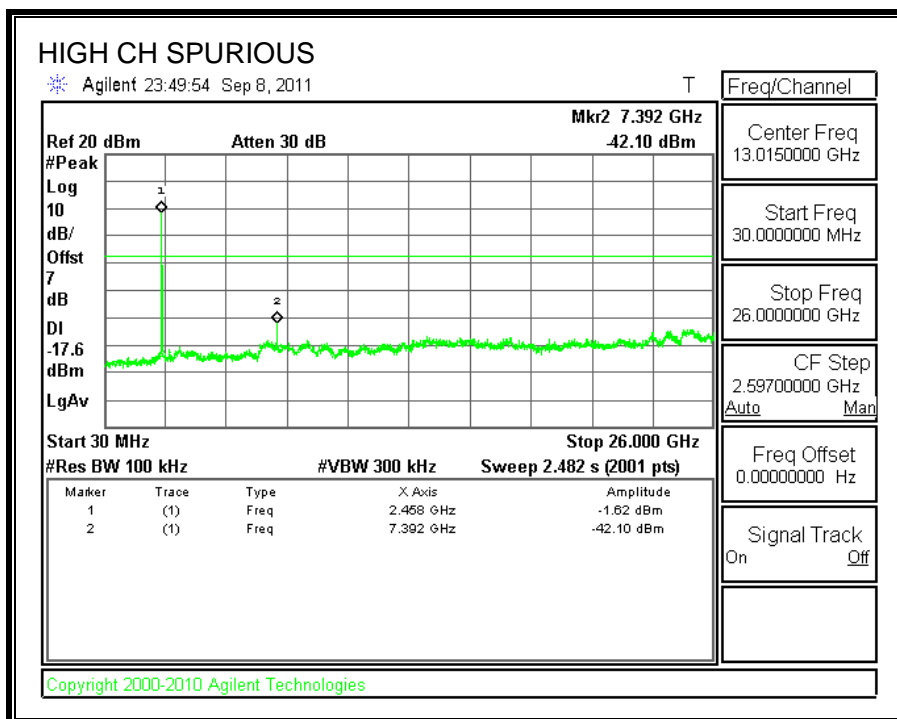
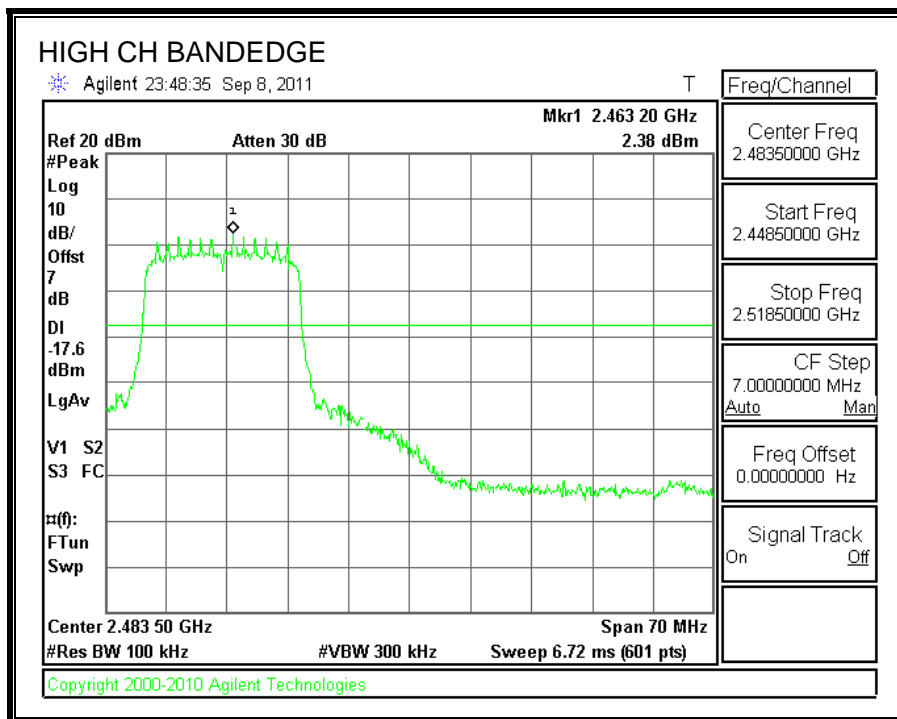
**SPURIOUS EMISSIONS, LOW CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**

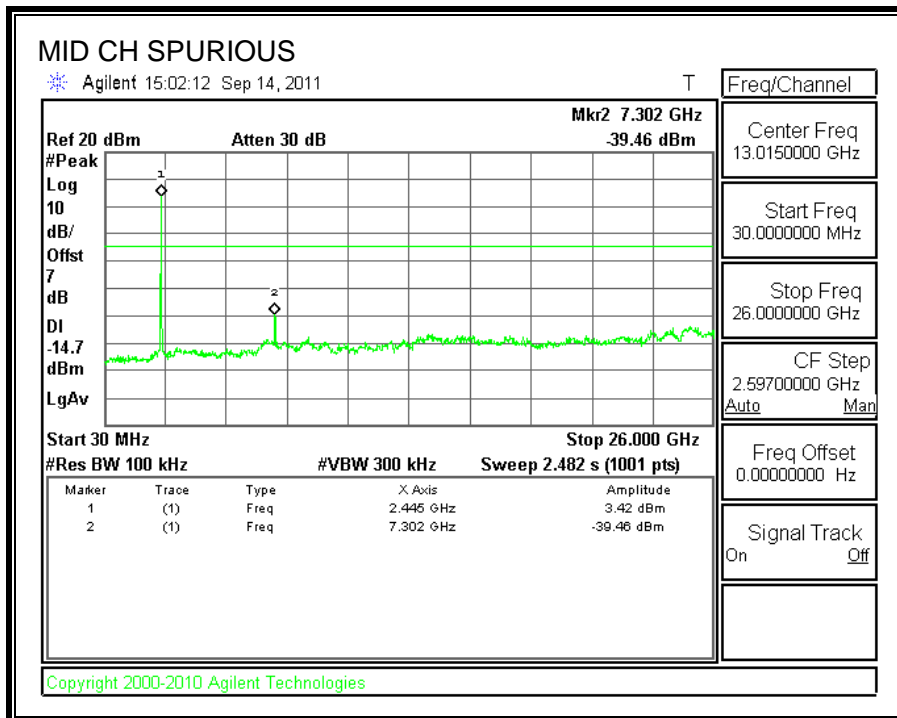
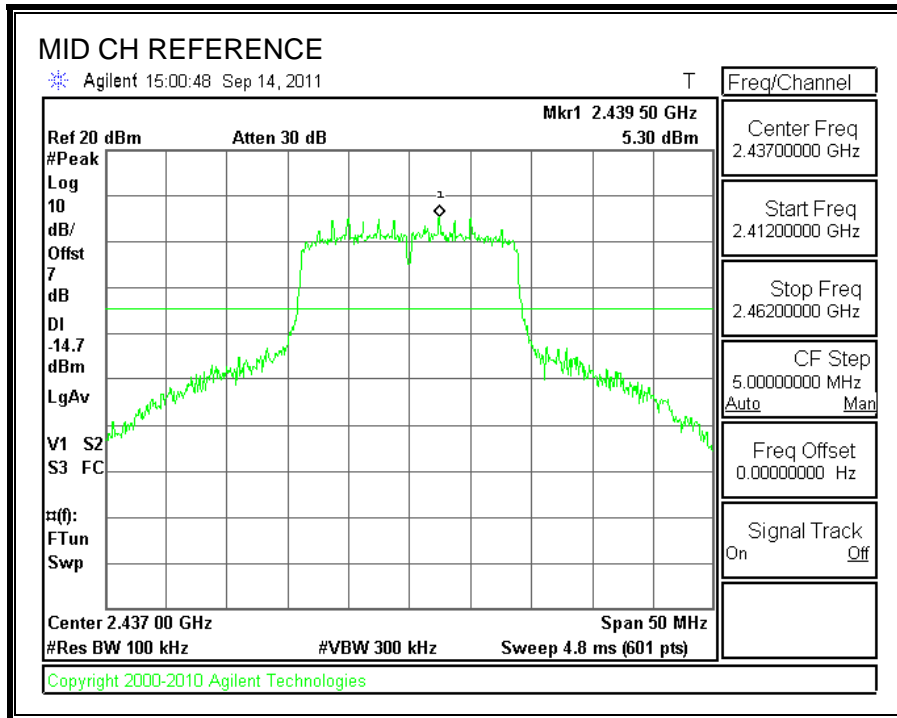


**SPURIOUS EMISSIONS, HIGH CHANNEL**

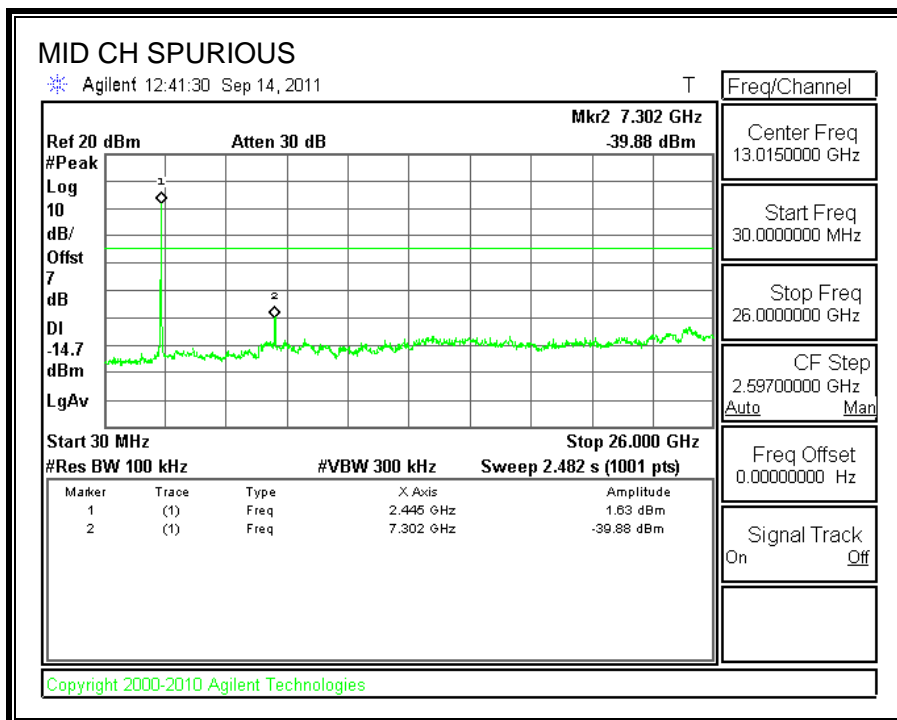
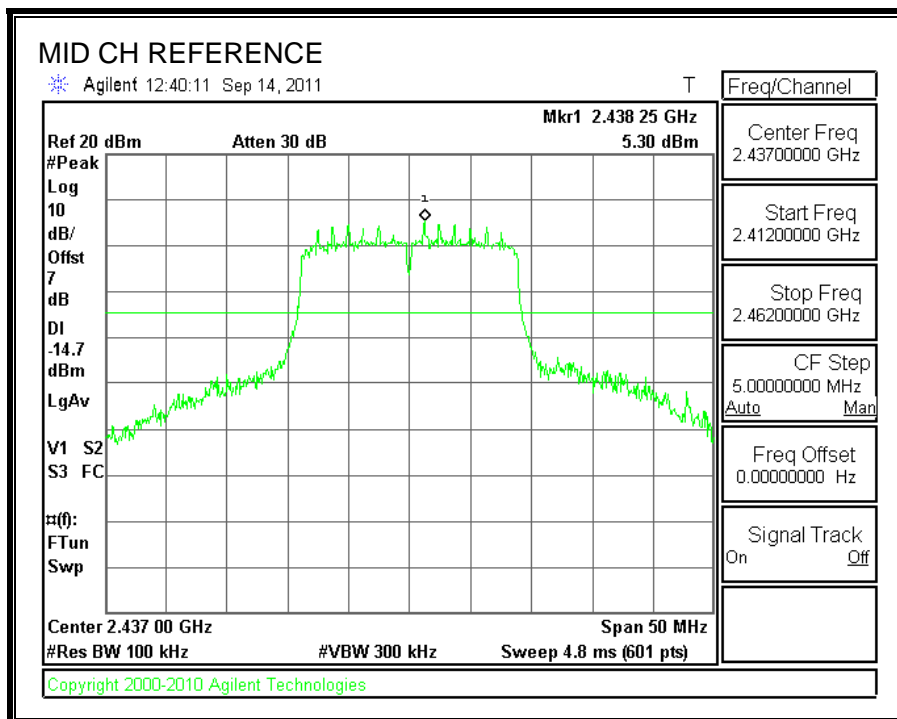


Type B

**SPURIOUS EMISSIONS, MID CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**



## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

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.

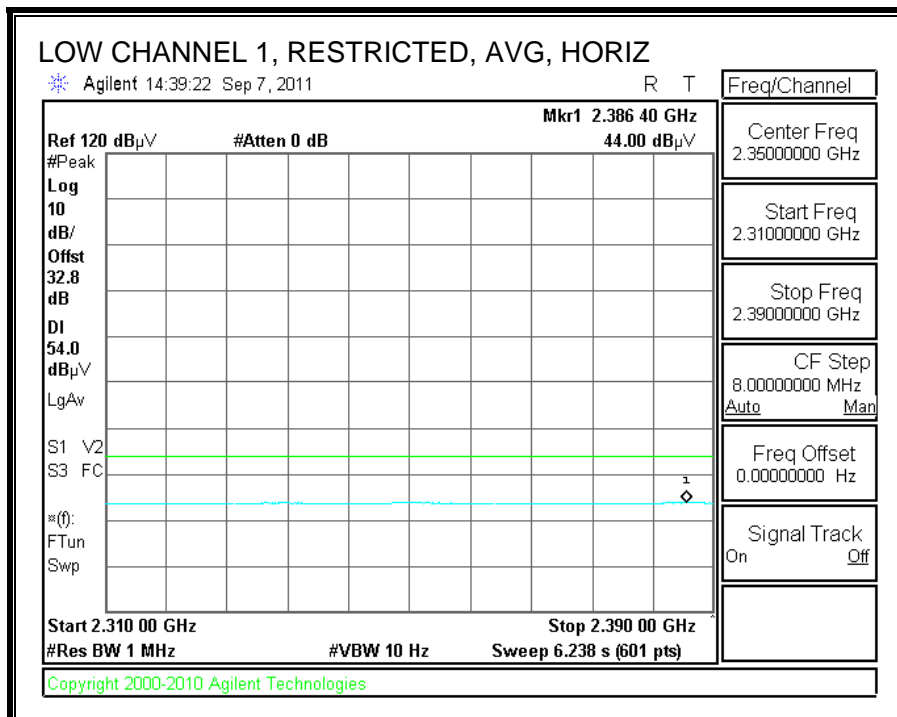
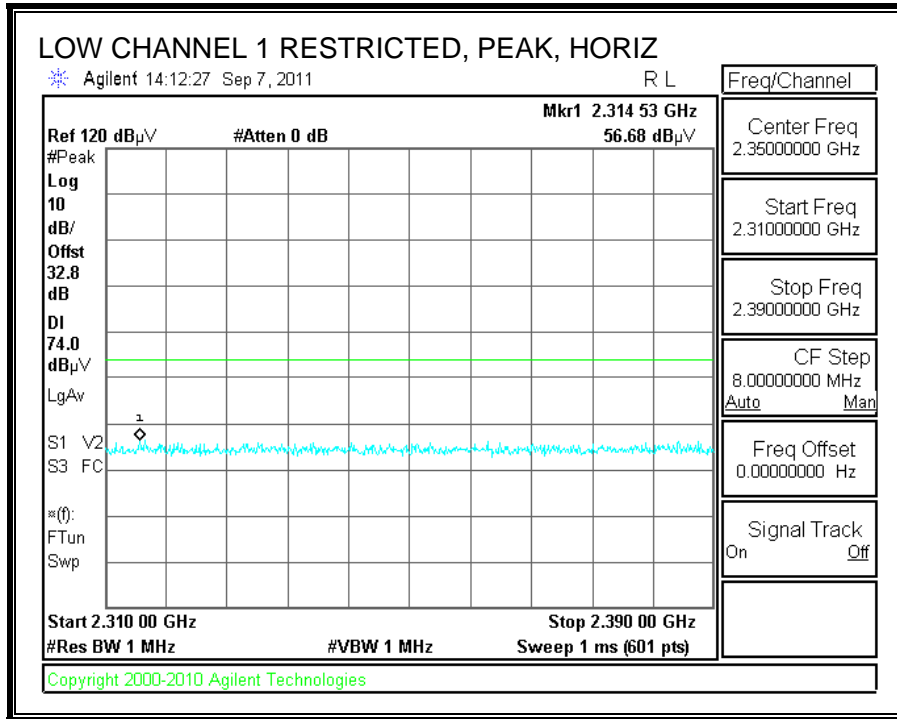
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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.

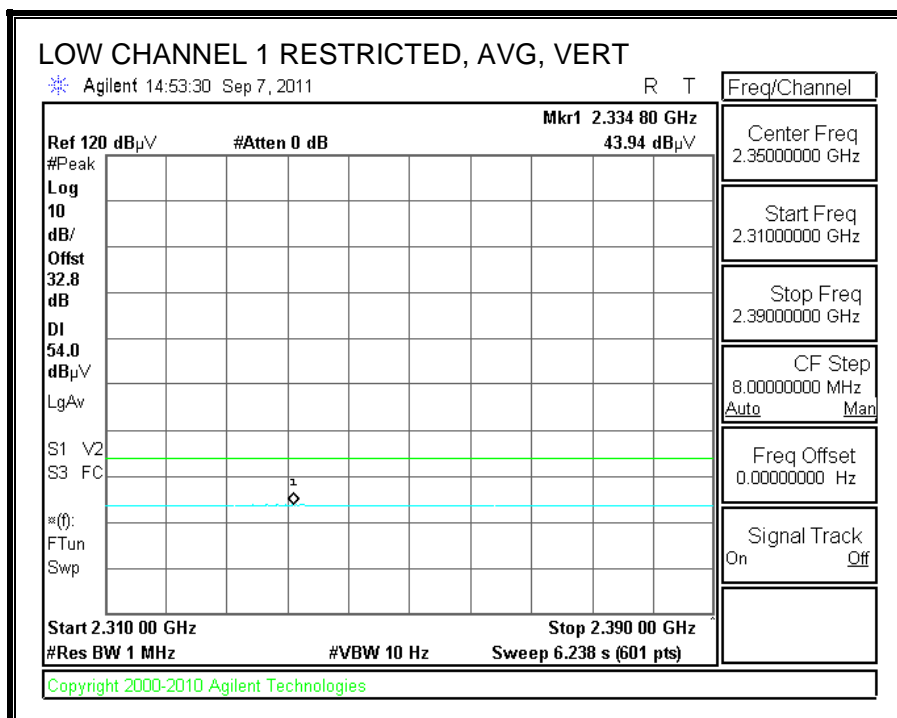
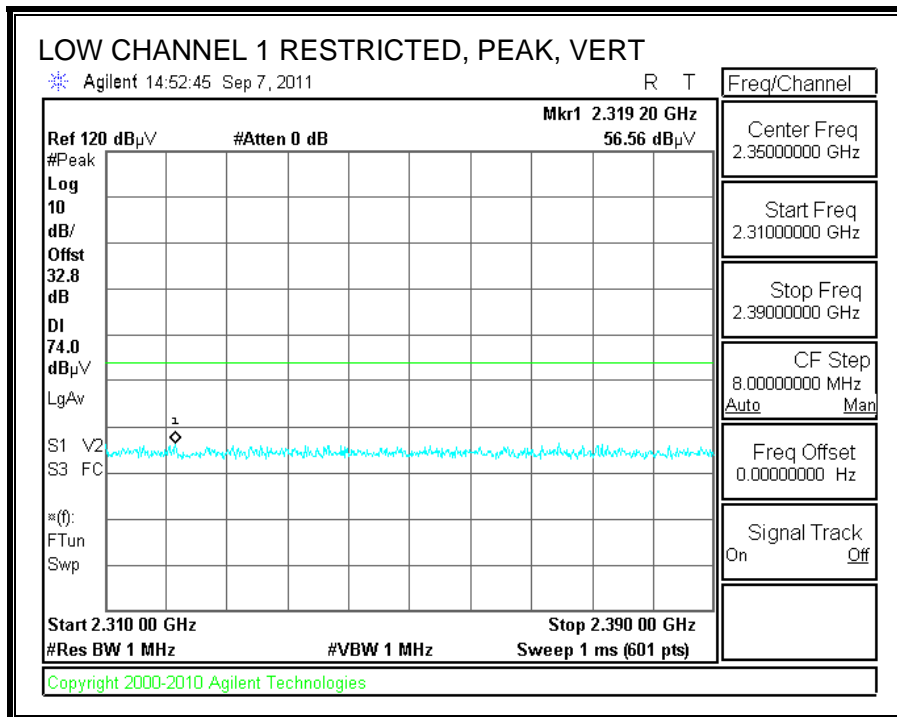
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

**8.2. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND**  
**Type A**

**RESTRICTED BANDEDGE (LOW CHANNEL 1, HORIZONTAL)**

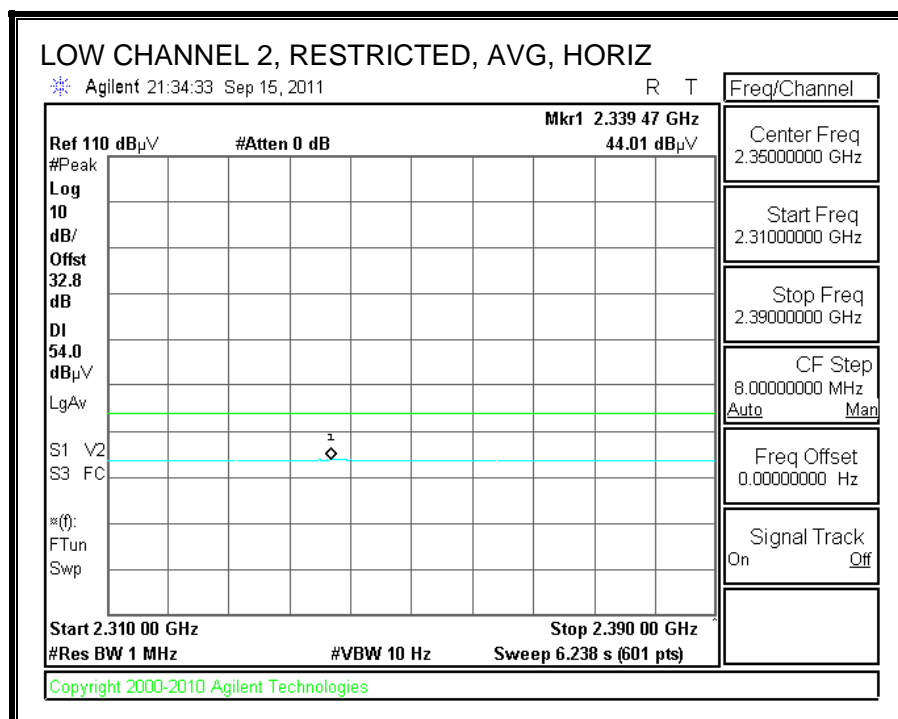
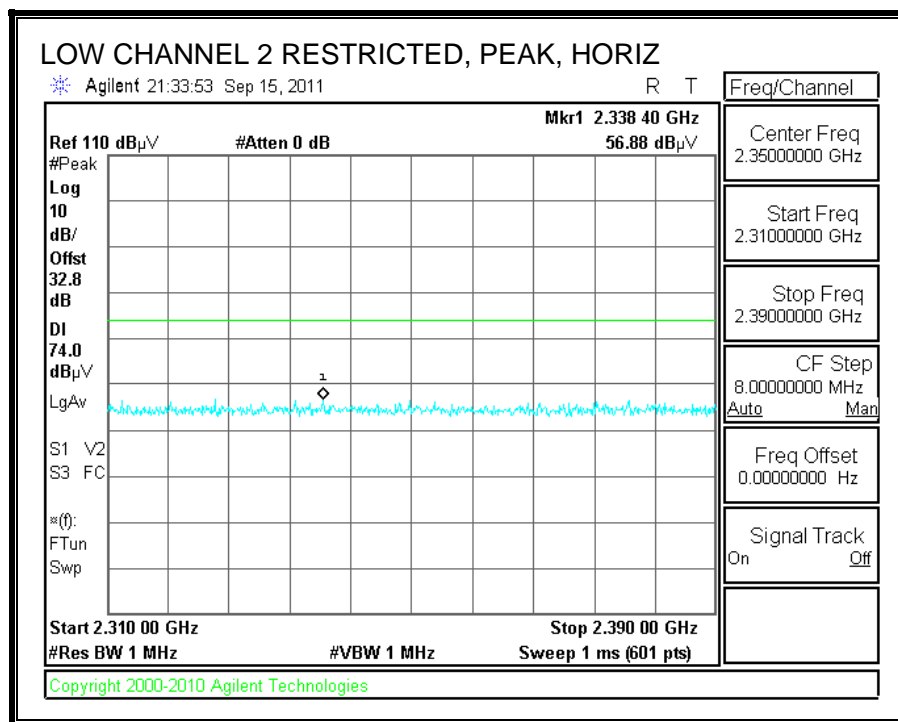


**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**

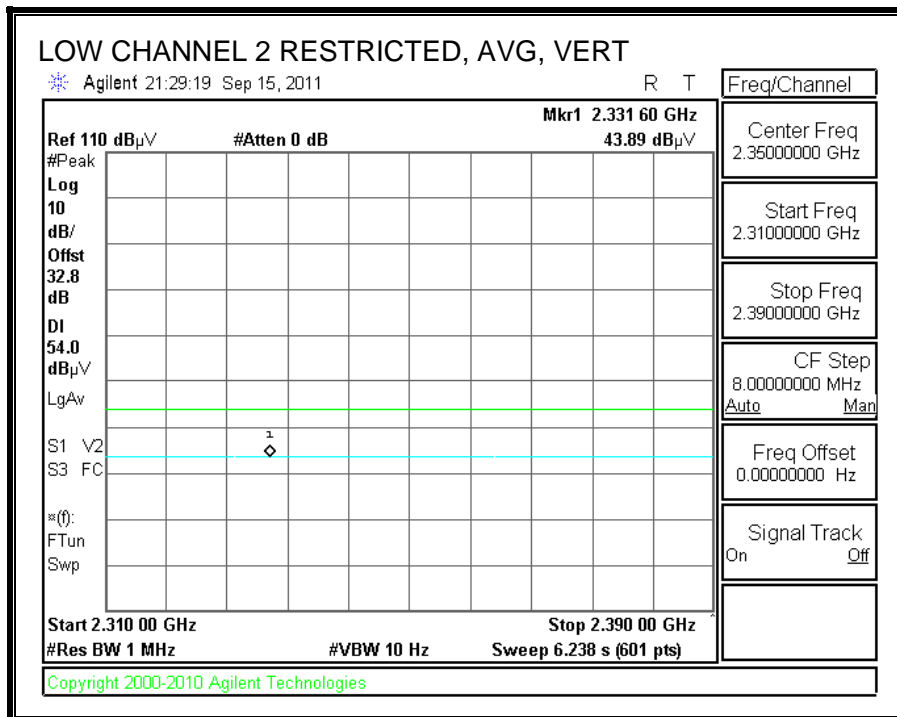
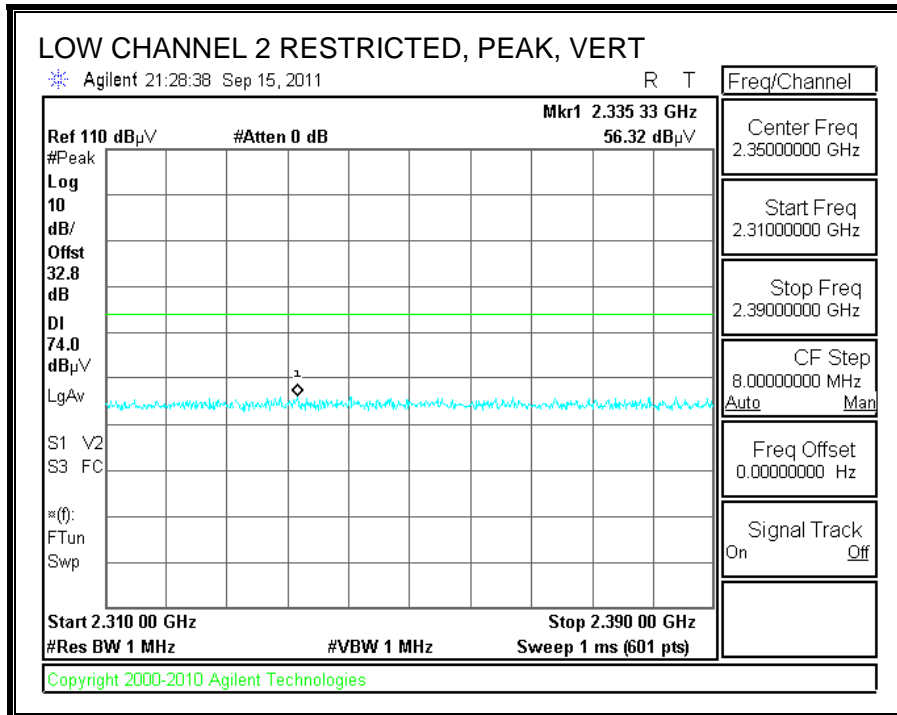




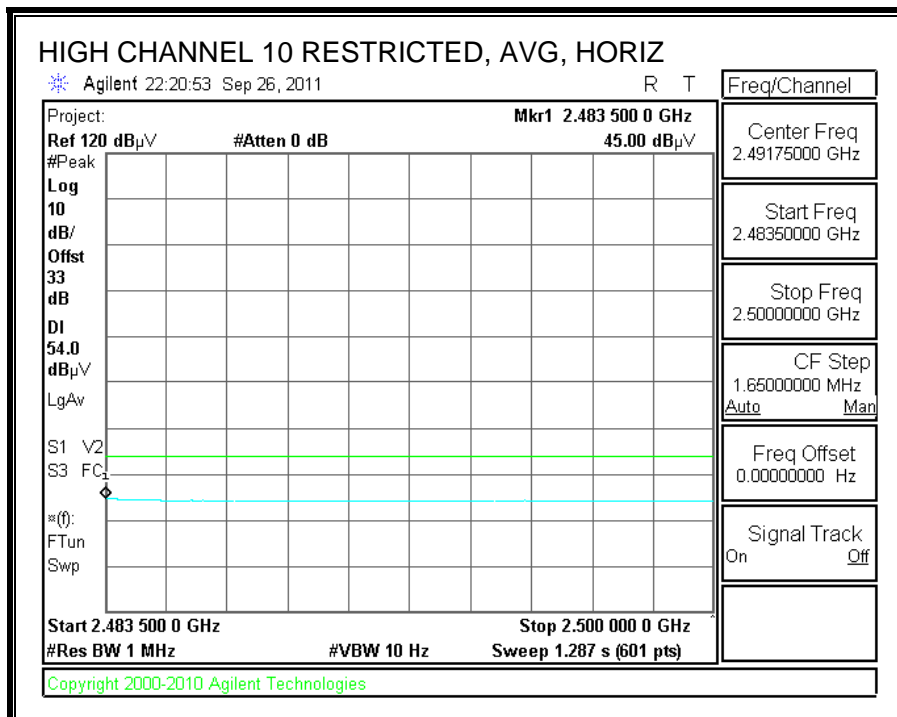
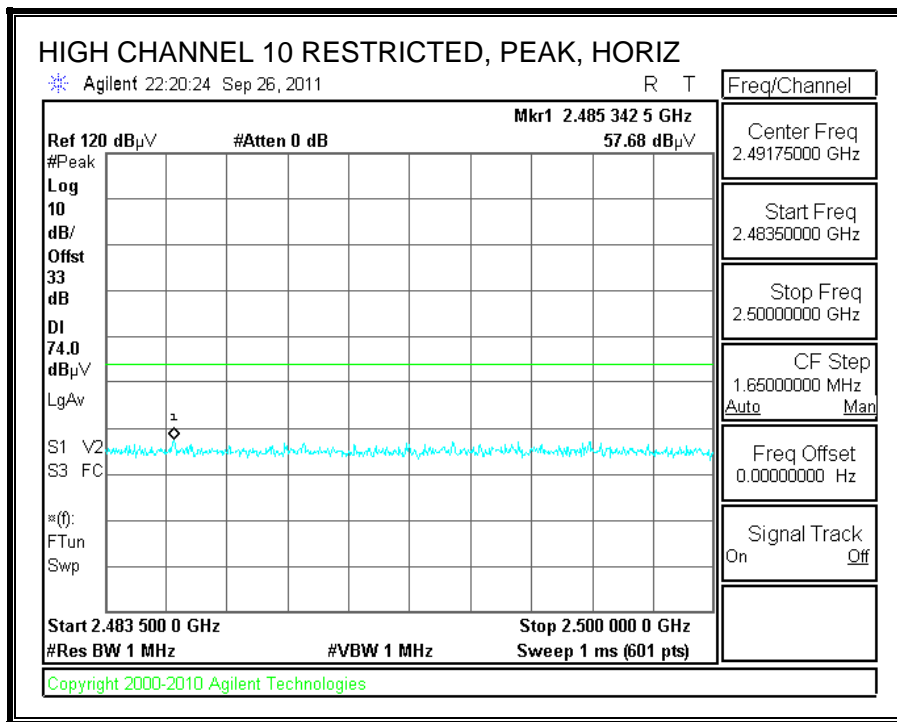
**RESTRICTED BANDEDGE (LOW CHANNEL 2, HORIZONTAL)**



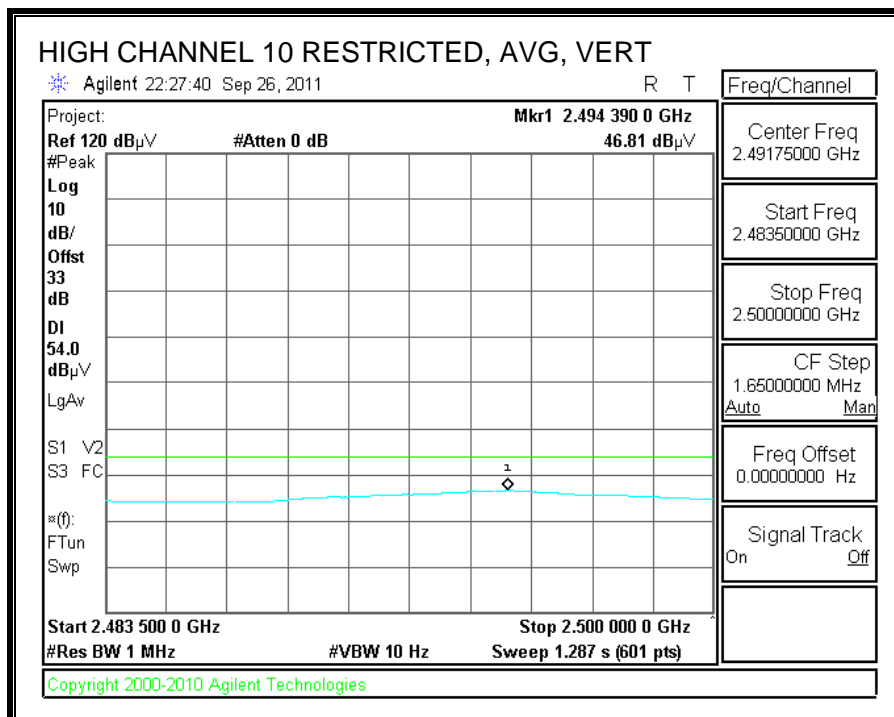
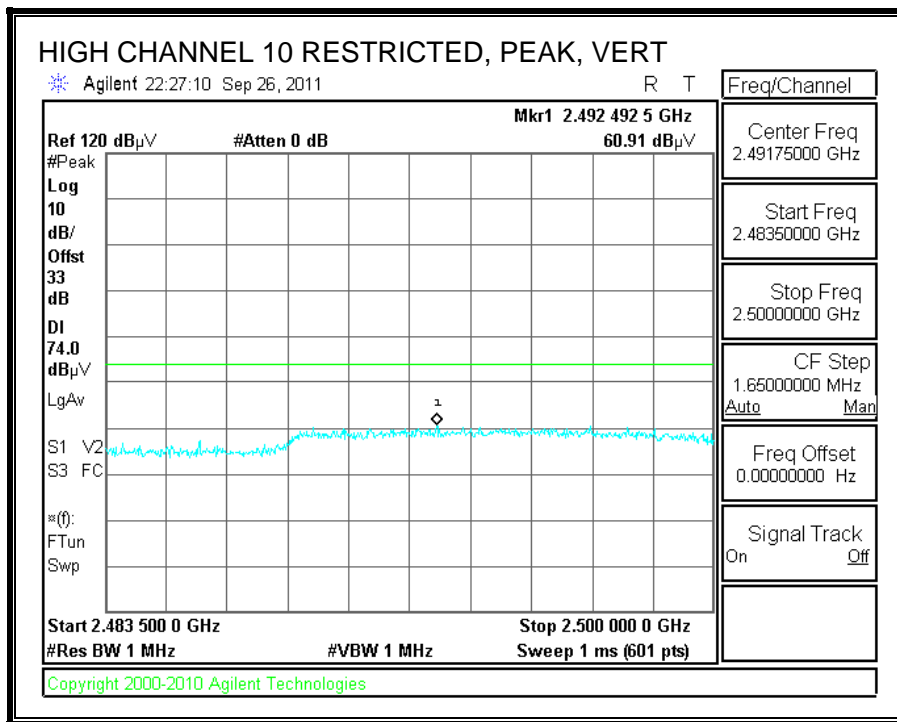
**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**



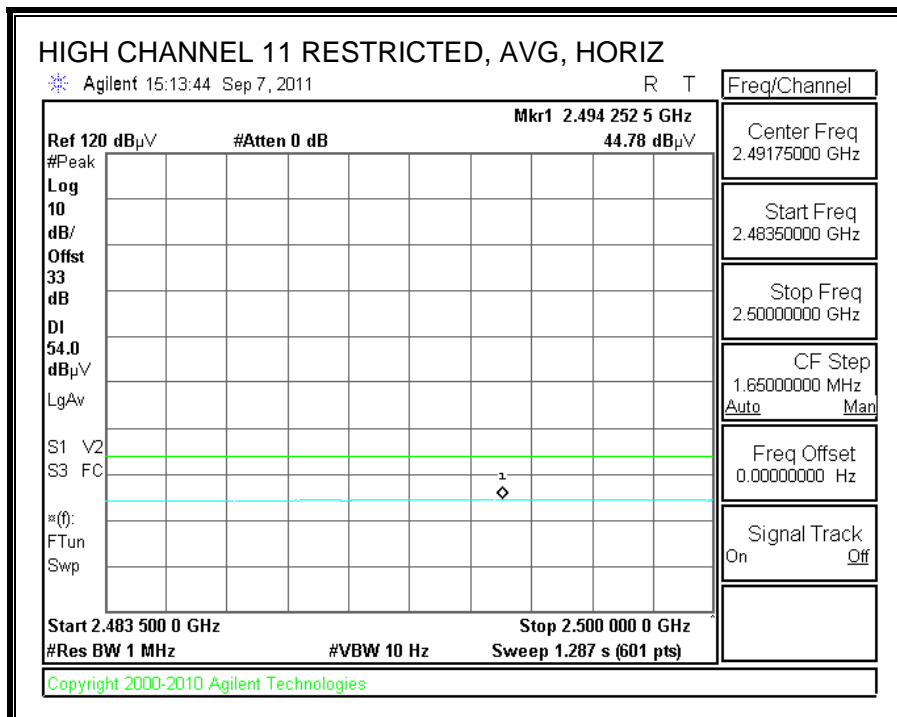
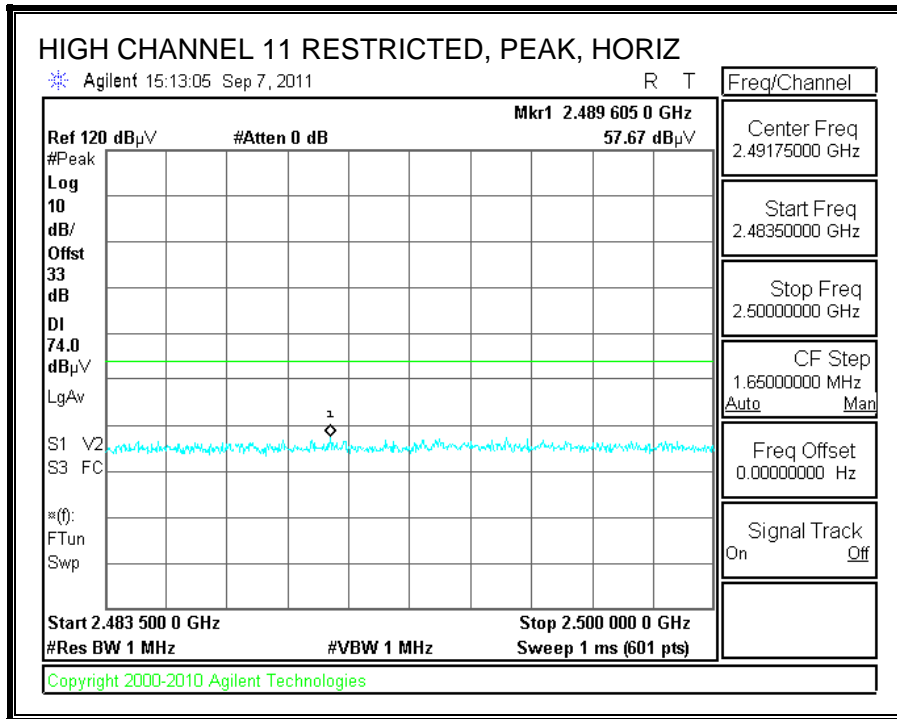
**RESTRICTED BANDEDGE (CHANNEL 10, HORIZONTAL)**



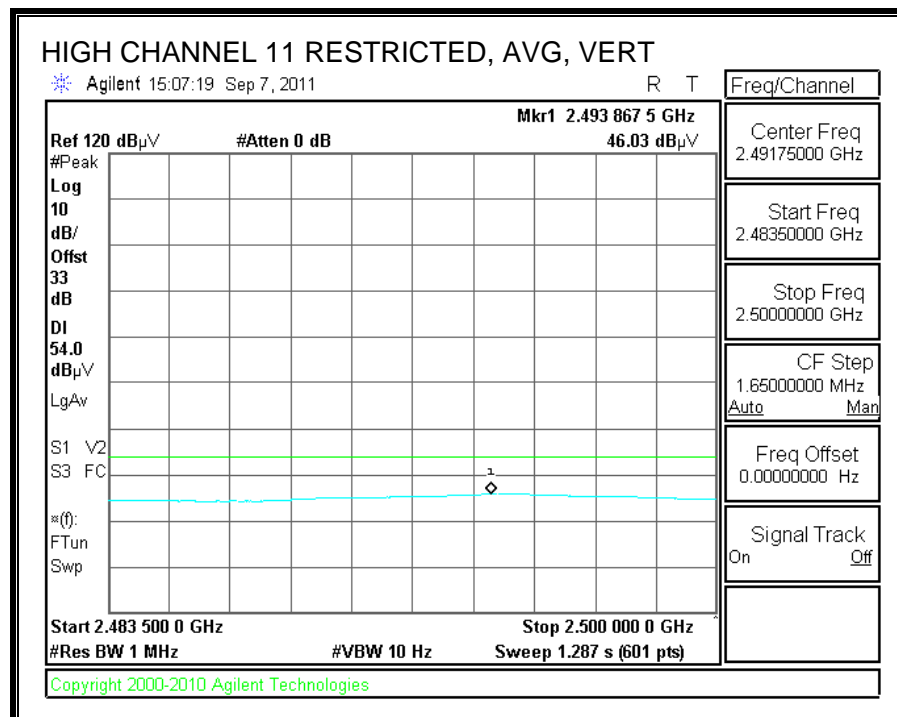
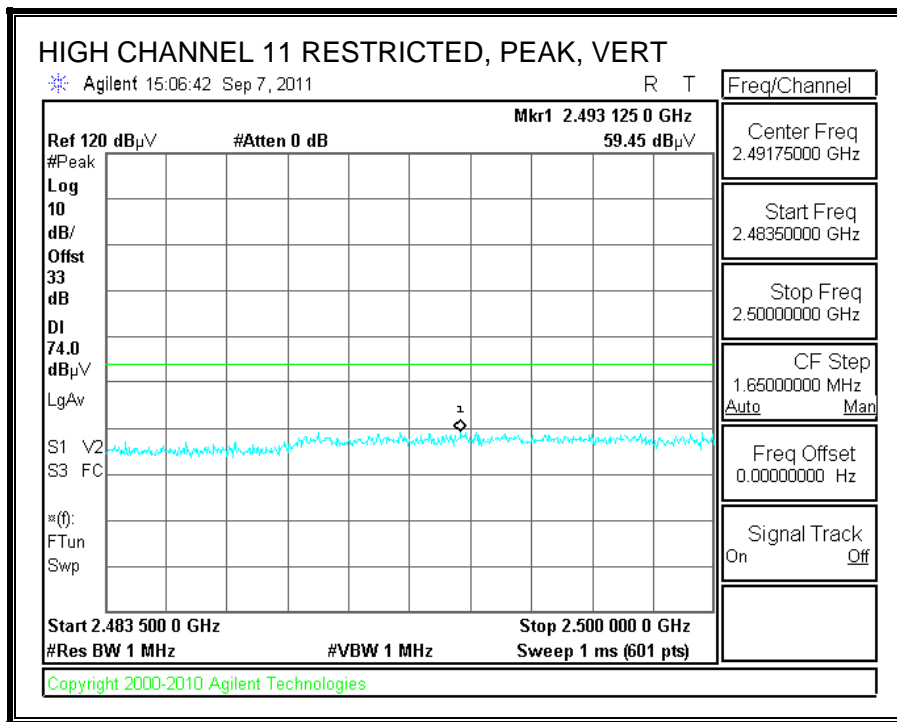
**RESTRICTED BANDEDGE (CHANNEL 10, VERTICAL)**



**RESTRICTED BANDEDGE (CHANNEL 11, HORIZONTAL)**



**RESTRICTED BANDEDGE ( CHANNEL 11, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/7/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT and Support Laptop  
 Mode: Transmit mode

**Test Equipment:**

Horn 1-18GHz T60; S/N: 2238 @3m	Pre-amplifier 1-26GHz T34 HP 8449B	Pre-amplifier 26-40GHz	Horn > 18GHz T39; ARA 18-26GHz; S/N:1013	Limit FCC 15.205
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Hi Frequency Cables

3' cable 22807700 3' cable 22807700	12' cable 22807600 12' cable 22807600	20' cable 22807500 20' cable 22807500	HPF	Reject Filter R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz
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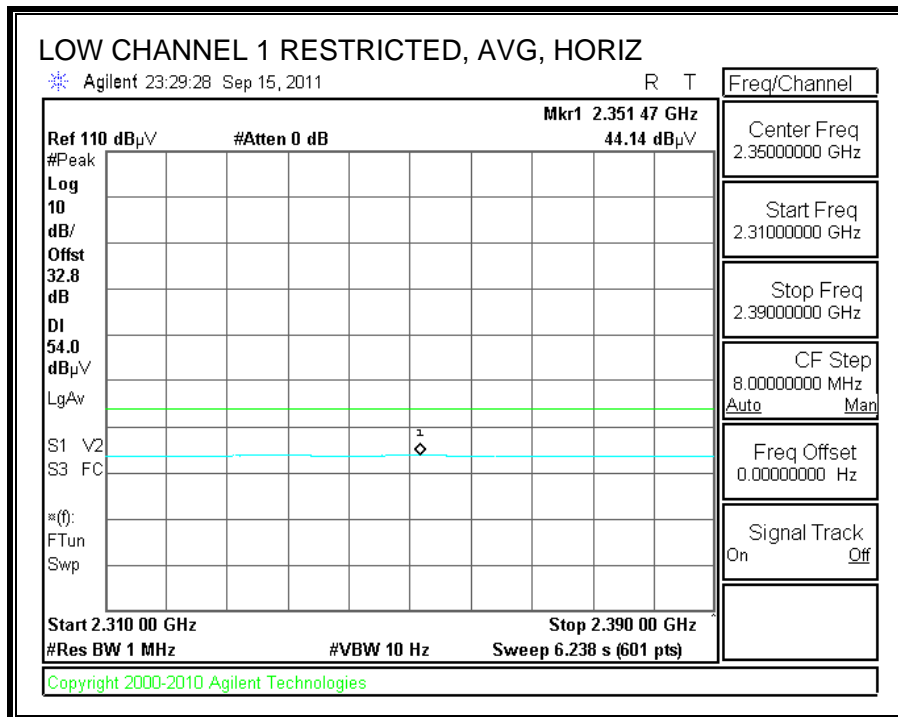
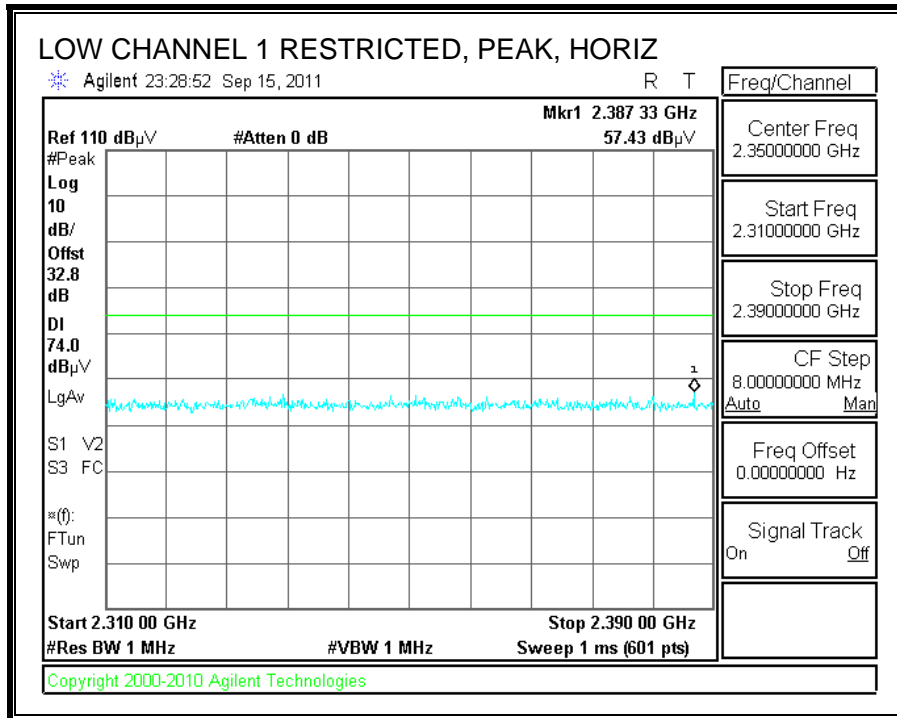
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
1.200	3.0	51.2	38.6	25.4	3.0	-37.5	0.0	0.0	42.1	29.5	74	54	-31.9	-24.5	V
4.824	3.0	43.0	37.5	33.9	6.8	-34.1	0.0	0.0	49.6	44.1	74	54	-24.4	-9.9	V
12.060	3.0	34.6	21.2	39.7	11.9	-32.3	0.0	0.0	54.0	40.5	74	54	-20.0	-13.5	Noise floor
4.824	3.0	38.7	27.2	33.9	6.8	-34.1	0.0	0.0	45.3	33.8	74	54	-28.7	-20.2	H
12.060	3.0	32.8	21.2	39.7	11.9	-32.3	0.0	0.0	52.2	40.5	74	54	-21.8	-13.5	Noise floor
1.200	3.0	55.5	33.2	25.4	3.0	-37.5	0.0	0.0	46.4	24.1	74	54	-27.6	-29.9	H
<b>Mid Ch</b>															
4.874	3.0	38.9	34.5	33.9	6.8	-34.0	0.0	0.0	45.6	41.2	74	54	-28.4	-12.8	H
7.311	3.0	33.1	22.9	36.6	9.1	-33.1	0.0	0.0	45.6	35.5	74	54	-28.4	-18.5	Noise floor
4.874	3.0	41.4	35.8	33.9	6.8	-34.0	0.0	0.0	48.1	42.5	74	54	-25.9	-11.5	V
7.311	3.0	34.7	22.9	36.6	9.1	-33.1	0.0	0.0	47.3	35.5	74	54	-26.7	-18.5	Noise floor
<b>High Ch</b>															
4.924	3.0	43.6	33.6	34.0	6.8	-34.0	0.0	0.0	50.4	40.4	74	54	-23.6	-13.6	V
7.386	3.0	36.5	25.6	36.6	9.1	-33.1	0.0	0.0	49.1	38.3	74	54	-24.9	-15.7	Noise floor
4.924	3.0	40.3	31.6	34.0	6.8	-34.0	0.0	0.0	47.1	38.3	74	54	-26.9	-15.7	H
7.386	3.0	35.6	23.5	36.6	9.1	-33.1	0.0	0.0	48.3	36.1	74	54	-25.7	-17.9	Noise floor

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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		

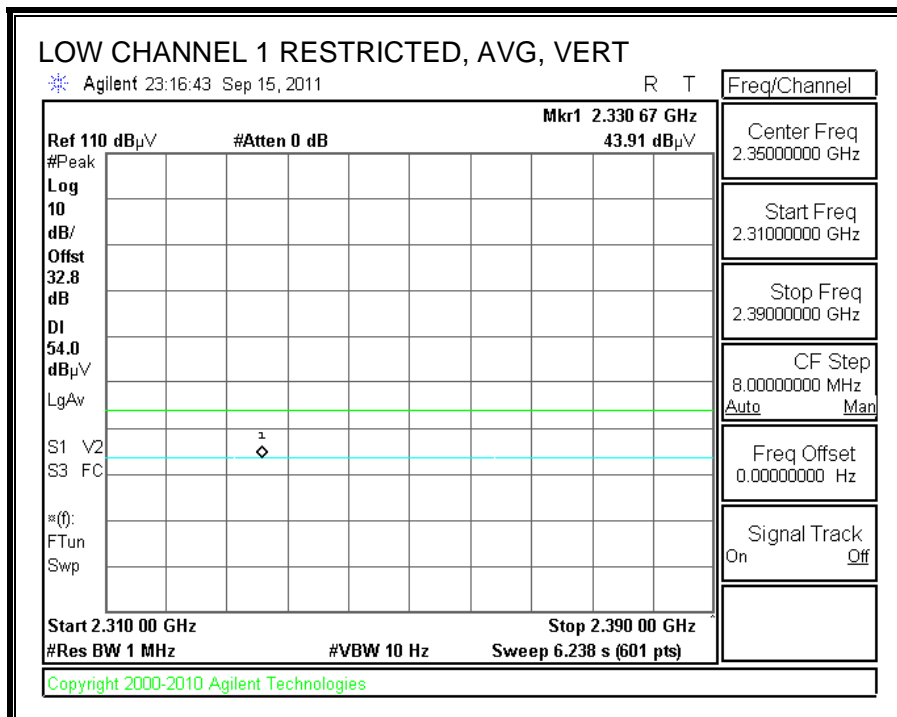
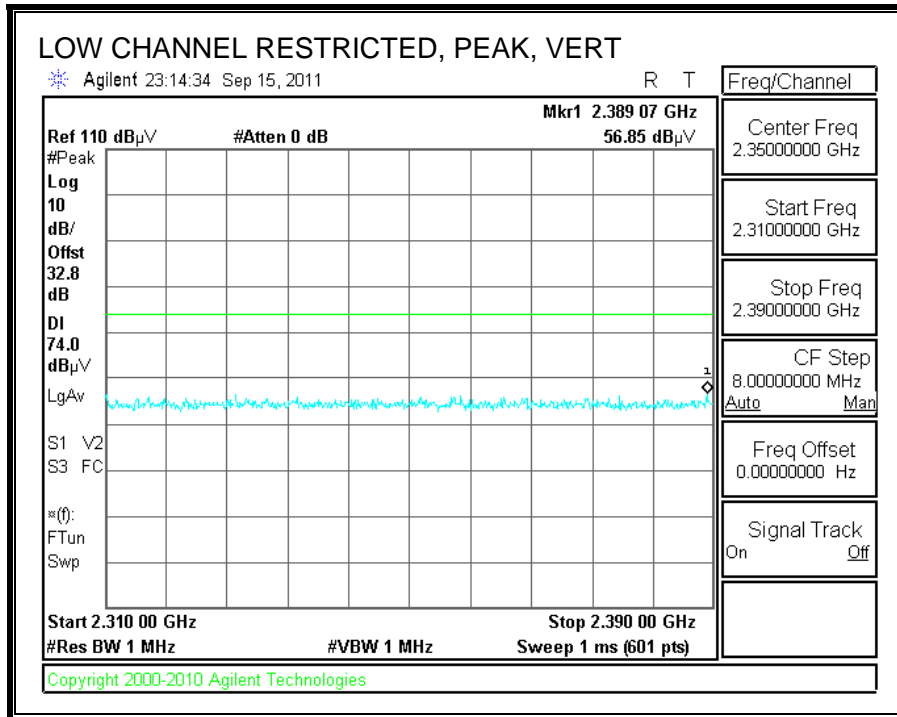
**Type B**

**RESTRICTED BANDEDGE (LOW CHANNEL 1, HORIZONTAL)**

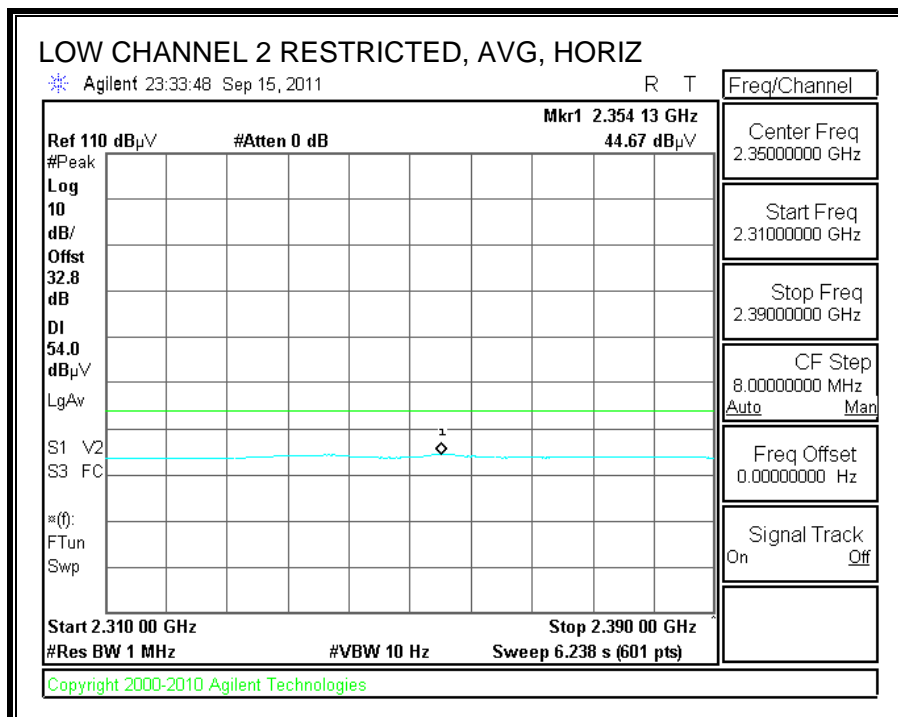
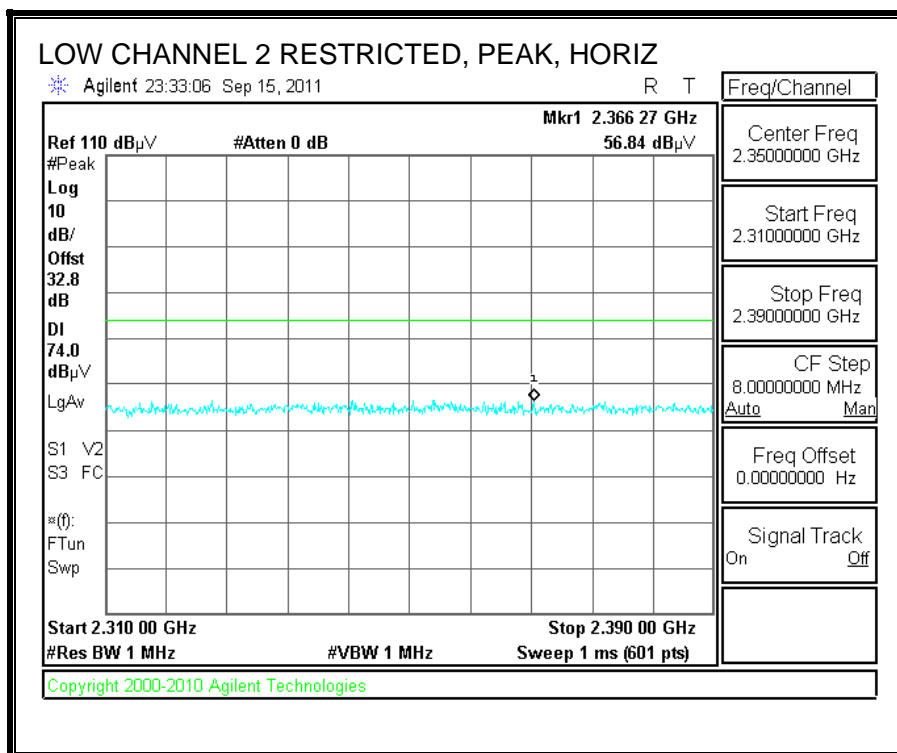




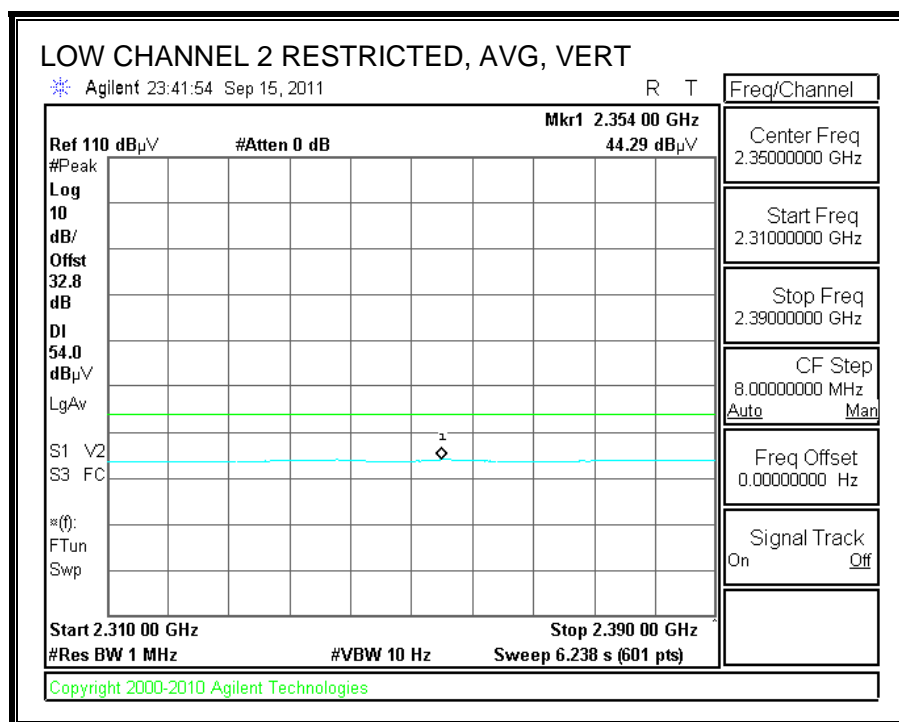
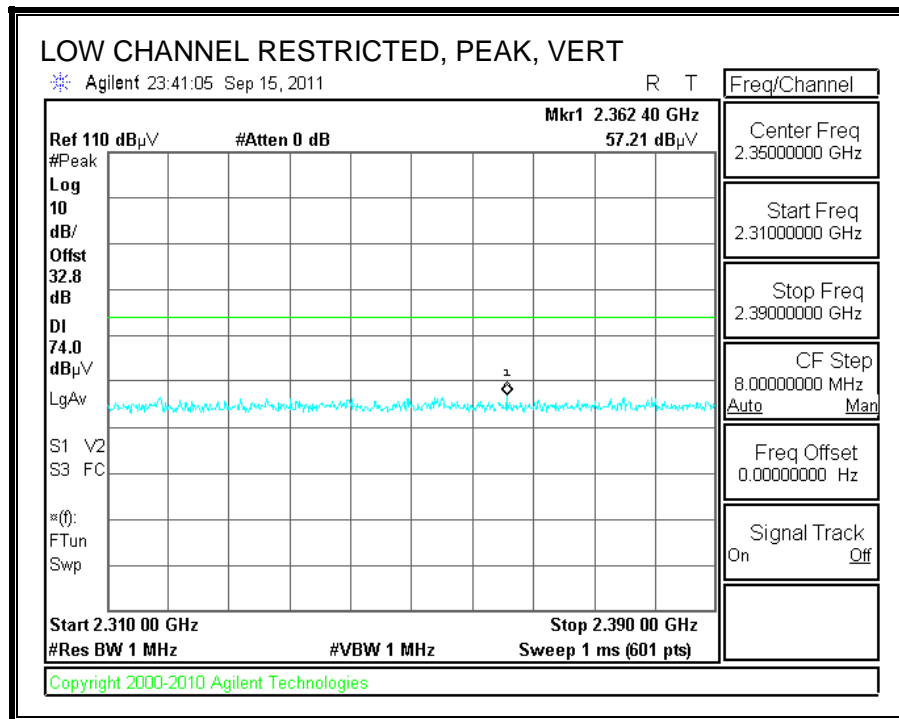
**RESTRICTED BANDEDGE (LOW CHANNEL1, VERTICAL)**



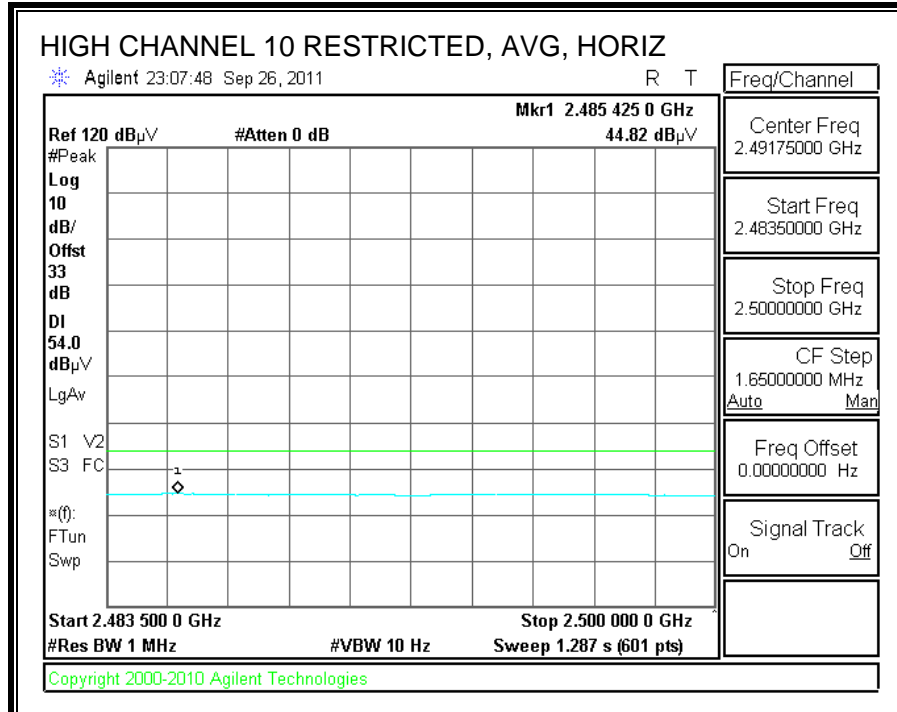
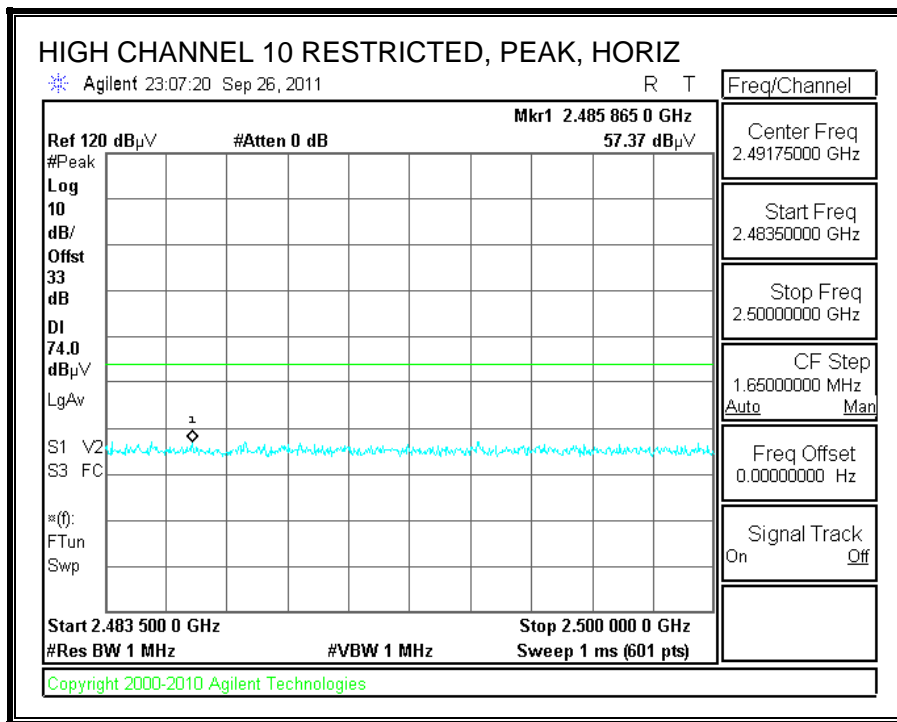
**RESTRICTED BANDEDGE (LOW CHANNEL 2, HORIZONTAL)**



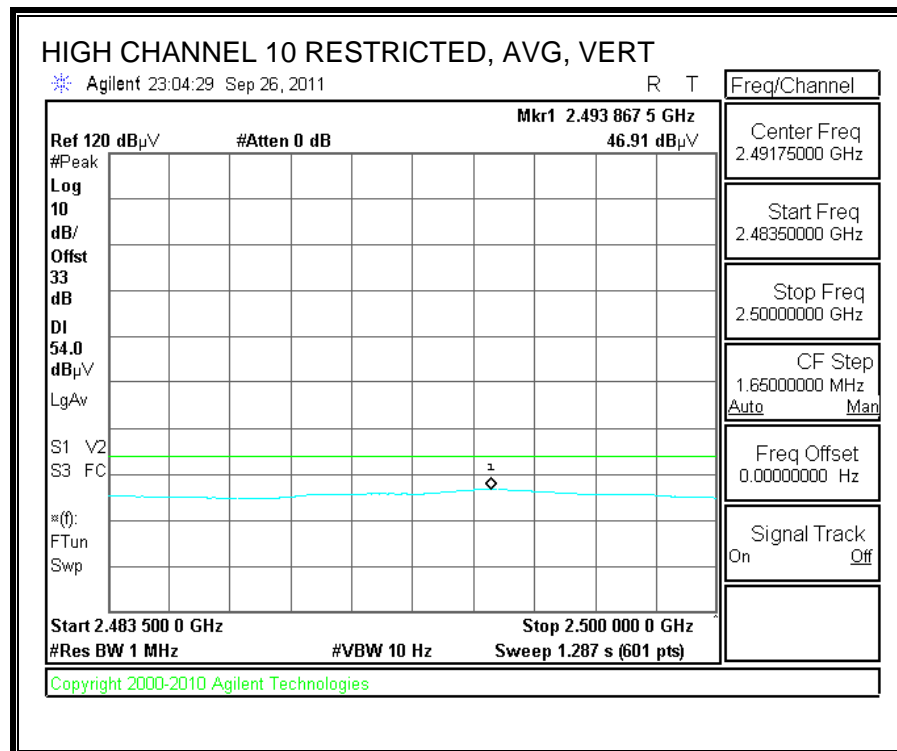
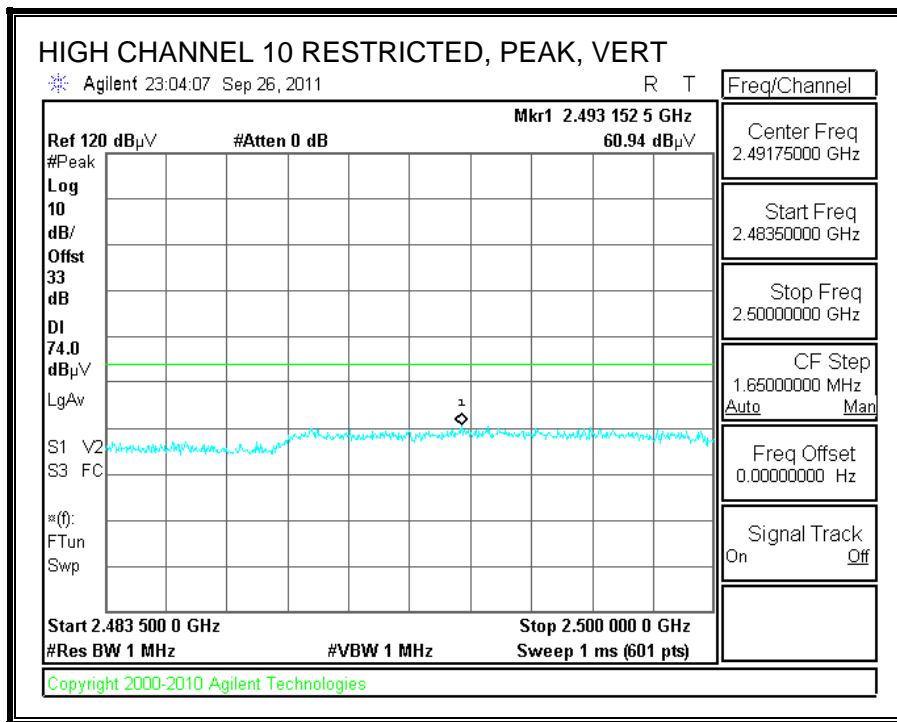
**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**



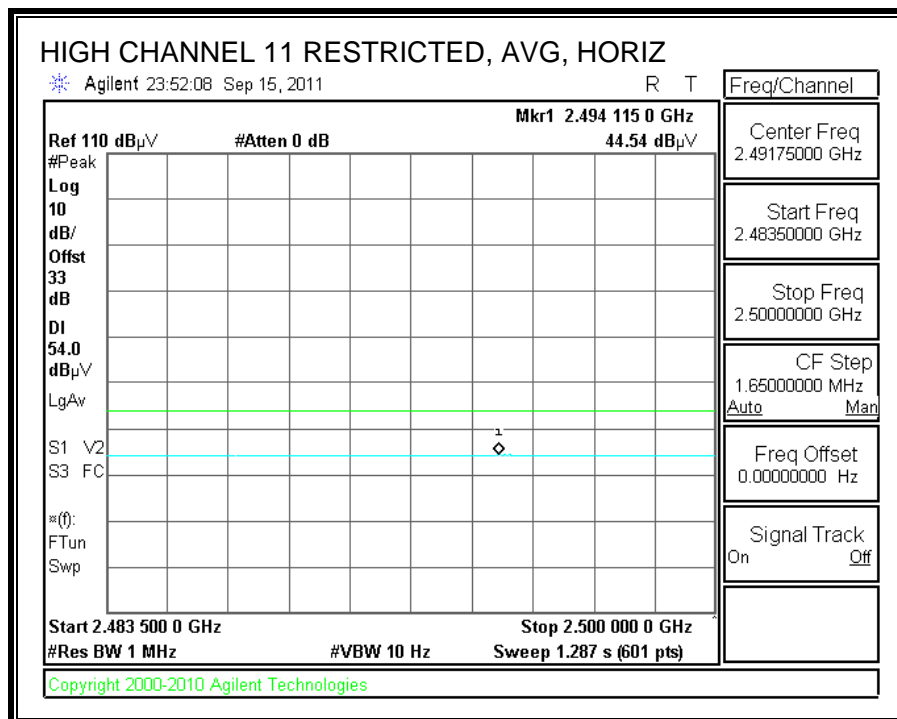
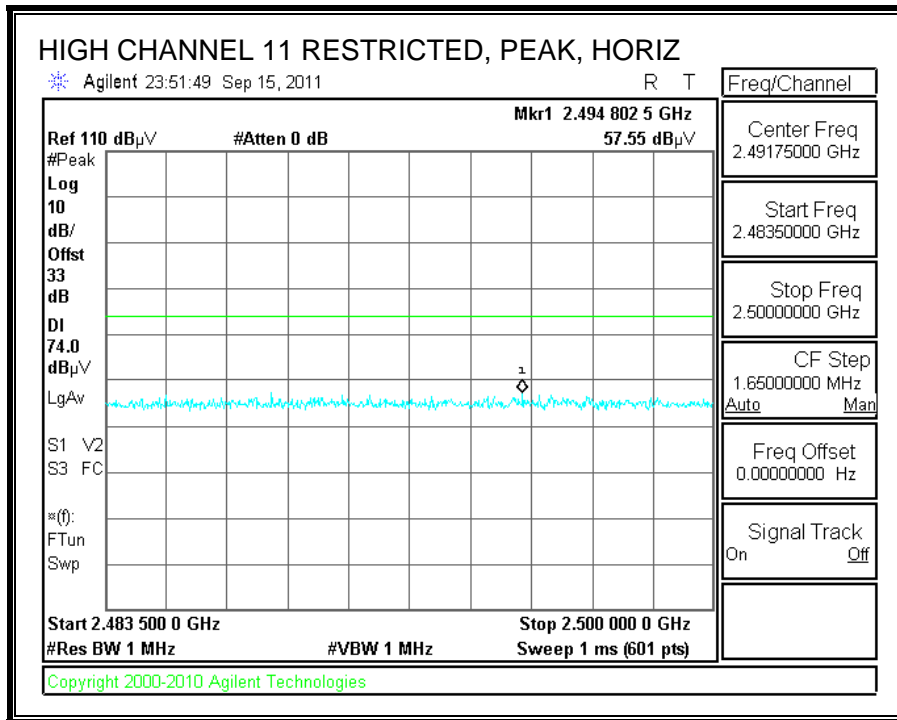
**RESTRICTED BANDEDGE (HIGH CHANNEL10, HORIZONTAL)**



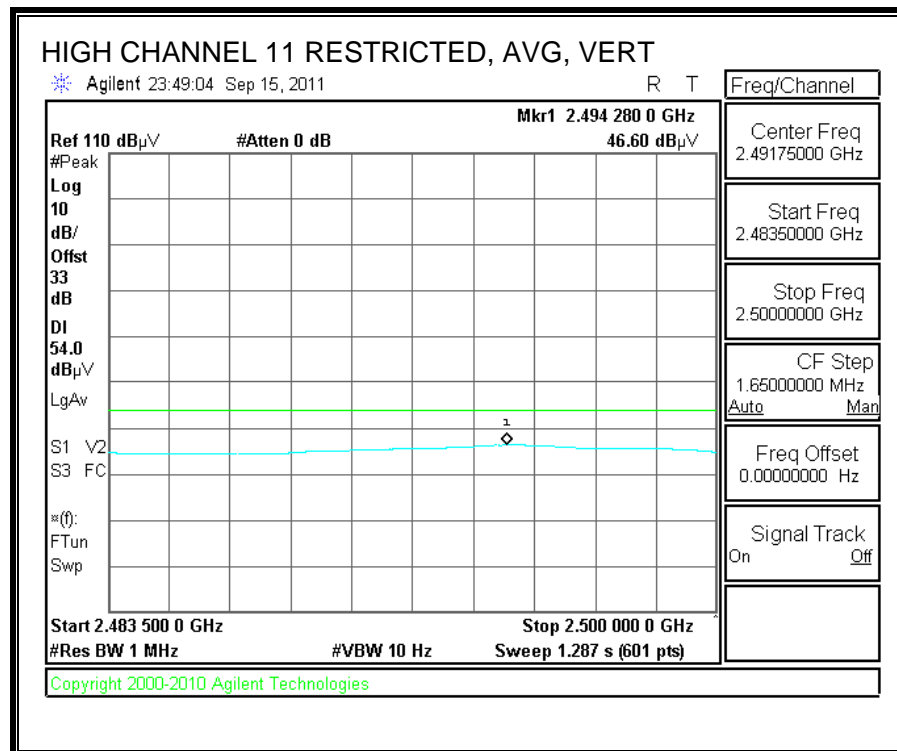
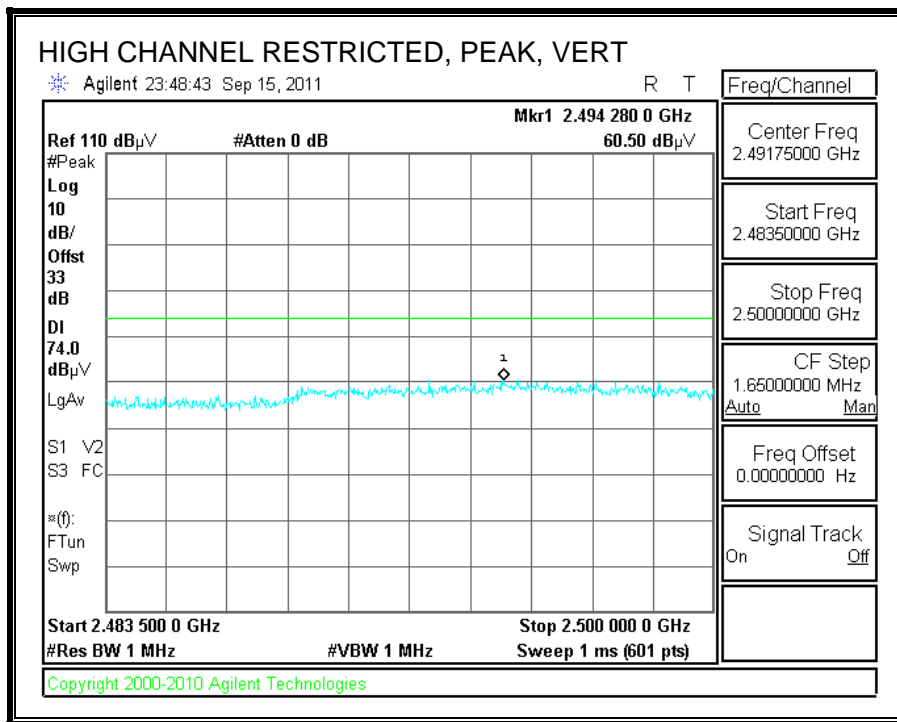
**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/17/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT and Support Laptop  
 Mode: Transmit b mode

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

<b>3' cable 22807700</b>	<b>12' cable 22807600</b>	<b>20' cable 22807500</b>	<b>HPF</b>	<b>Reject Filter</b>	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz
3' cable 22807700	12' cable 22807600	20' cable 22807600		R_001	

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
1.200	3.0	57.3	43.2	25.4	3.0	-37.5	0.0	0.0	48.2	34.1	74	54	-25.8	-19.9	V
4.824	3.0	43.5	37.1	33.9	6.8	-34.1	0.0	0.0	50.1	43.7	74	54	-23.9	-10.3	V
12.060	3.0	37.3	25.5	39.7	11.9	-32.3	0.0	0.0	56.6	44.8	74	54	-17.4	-9.2	Noise floor
4.824	3.0	41.4	29.1	33.9	6.8	-34.1	0.0	0.0	48.0	35.7	74	54	-26.0	-18.3	H
12.060	3.0	37.7	25.5	39.7	11.9	-32.3	0.0	0.0	57.0	44.8	74	54	-17.0	-9.2	Noise floor
1.200	3.0	59.3	44.4	25.4	3.0	-37.5	0.0	0.0	50.2	35.3	74	54	-23.8	-18.7	H
<b>Mid Ch</b>															
4.874	3.0	44.6	30.2	33.9	6.8	-34.0	0.0	0.0	51.3	36.9	74	54	-22.7	-17.1	V
7.311	3.0	45.4	33.5	36.6	9.1	-33.1	0.0	0.0	57.9	46.0	74	54	-16.1	-8.0	Noise floor
4.874	3.0	43.3	32.3	33.9	6.8	-34.0	0.0	0.0	50.0	39.0	74	54	-24.0	-15.0	H
7.311	3.0	41.3	26.6	36.6	9.1	-33.1	0.0	0.0	53.9	39.2	74	54	-20.1	-14.8	Noise floor
<b>High Ch</b>															
4.924	3.0	48.8	33.6	34.0	6.8	-34.0	0.0	0.0	55.6	40.3	74	54	-18.4	-13.7	V
7.386	3.0	39.7	26.7	36.6	9.1	-33.1	0.0	0.0	52.4	39.4	74	54	-21.6	-14.6	Noise floor
4.924	3.0	46.6	33.4	34.0	6.8	-34.0	0.0	0.0	53.4	40.1	74	54	-20.6	-13.9	H
7.386	3.0	40.0	26.7	36.6	9.1	-33.1	0.0	0.0	52.6	39.3	74	54	-21.4	-14.7	Noise floor

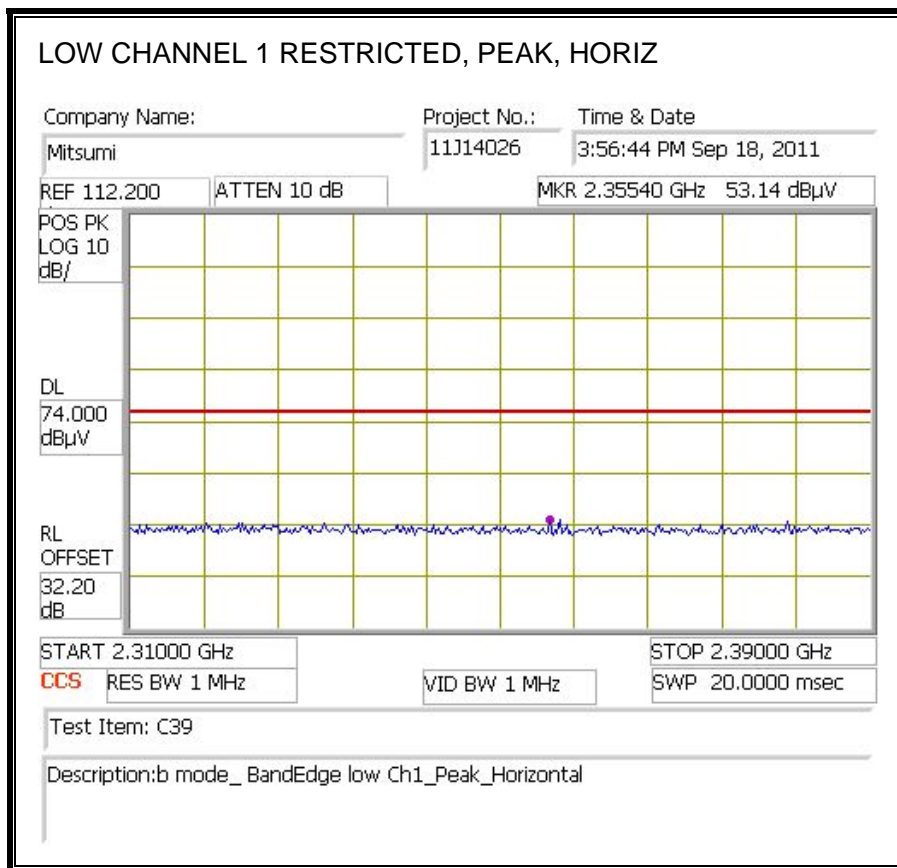
Rev. 07.08.11

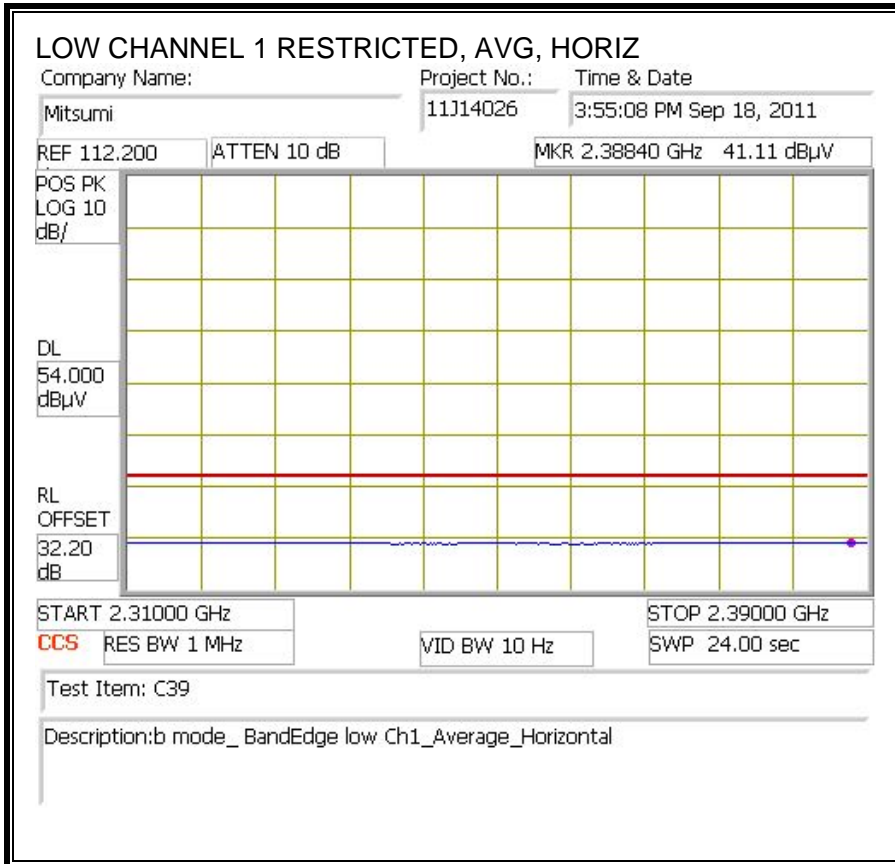
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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



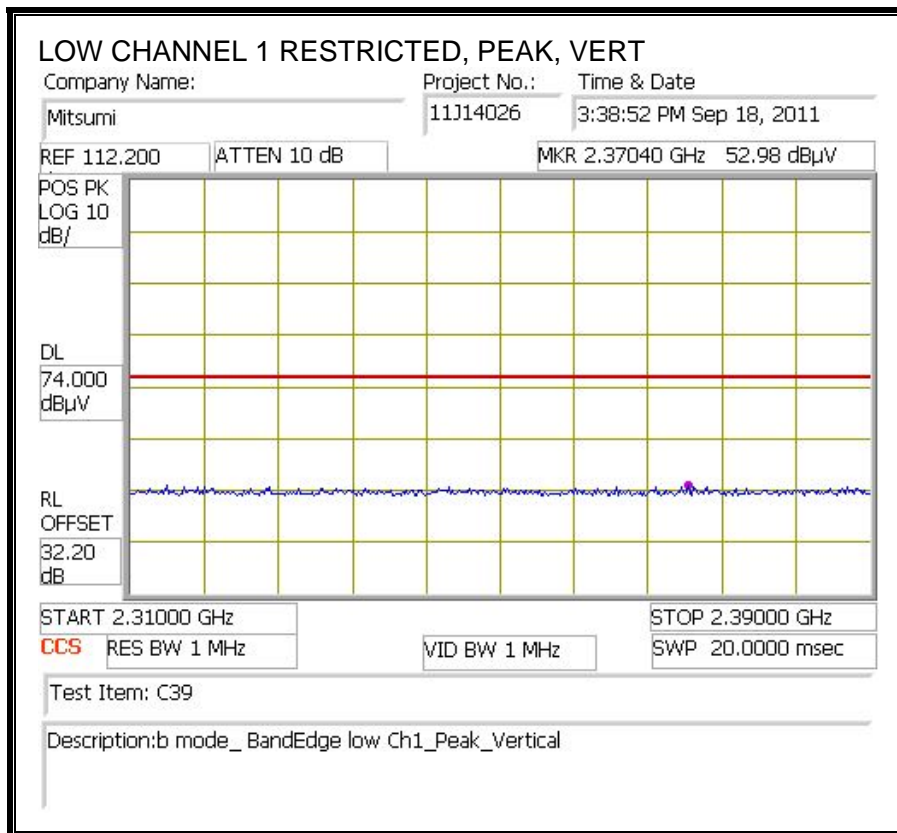
**Type C**

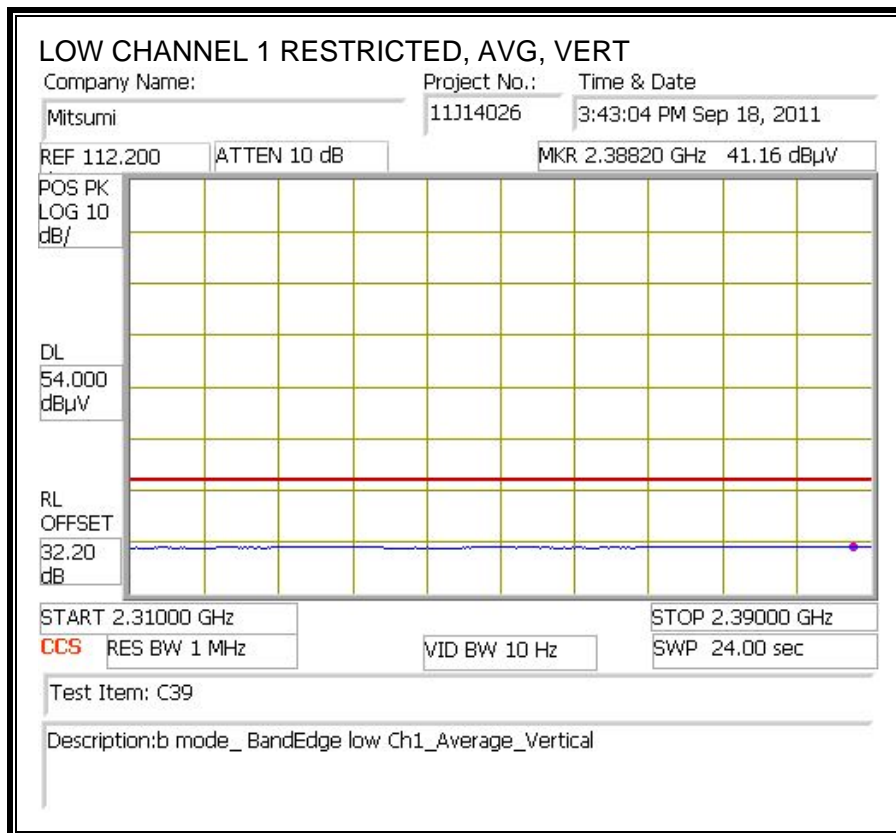
**RESTRICTED BANDEDGE (LOW CHANNEL 1, HORIZONTAL)**



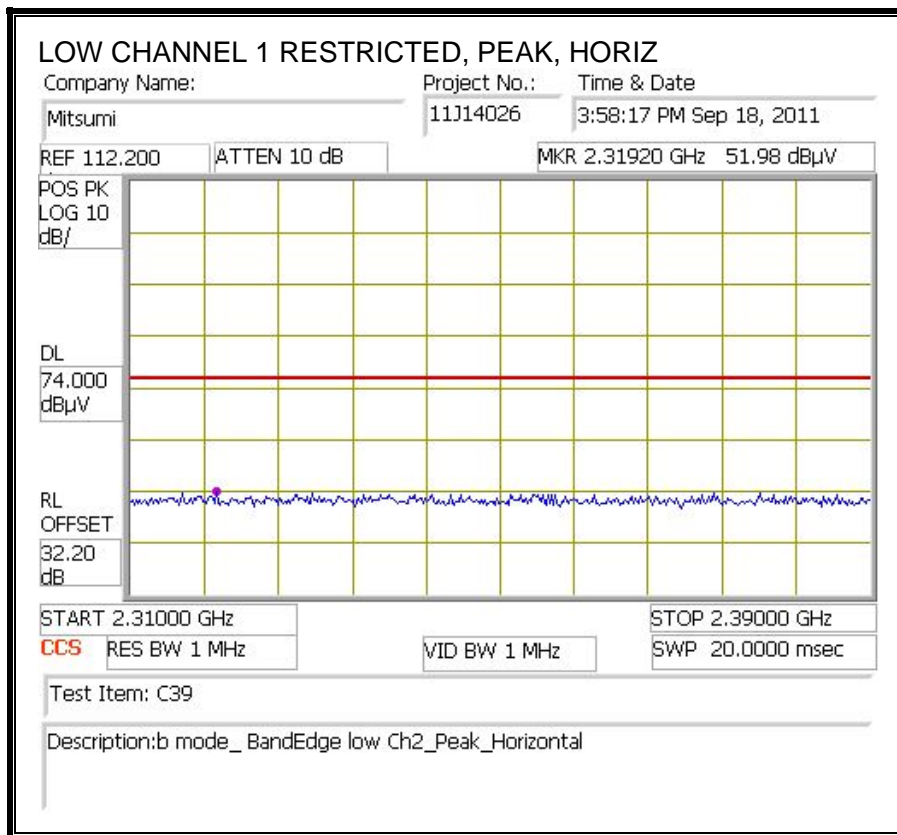


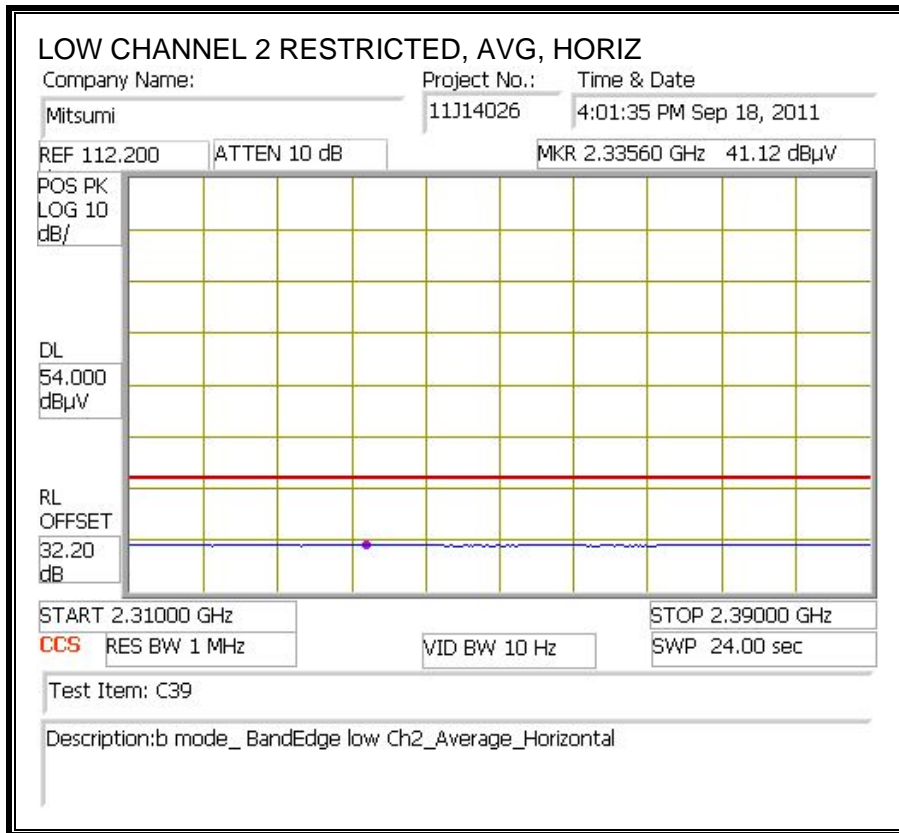
**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**



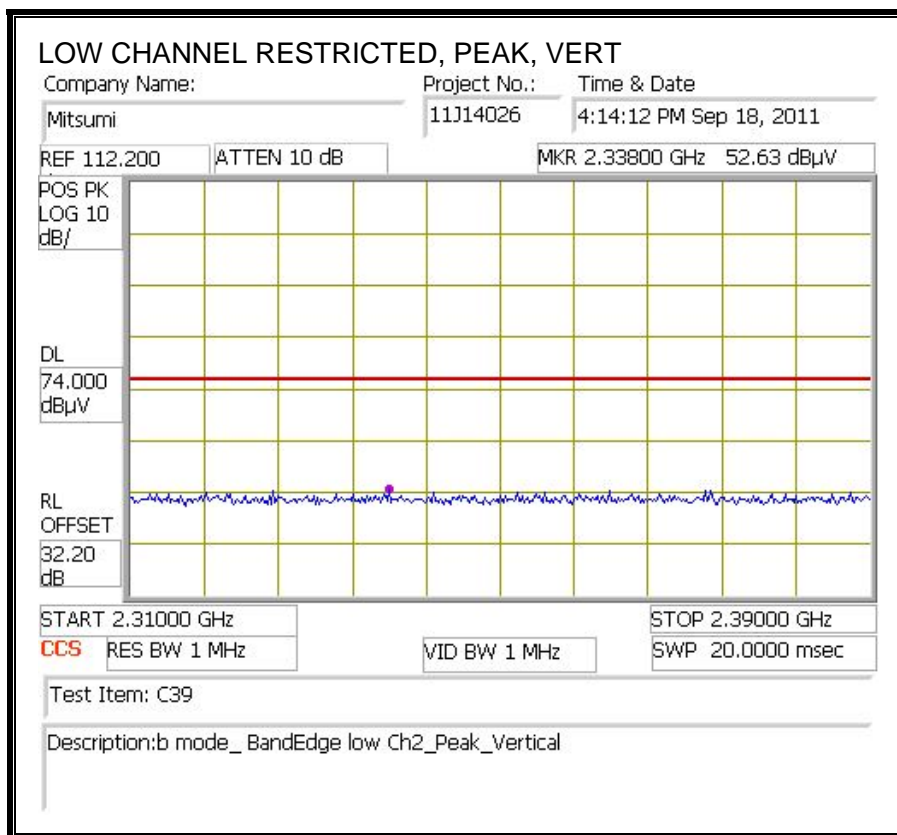


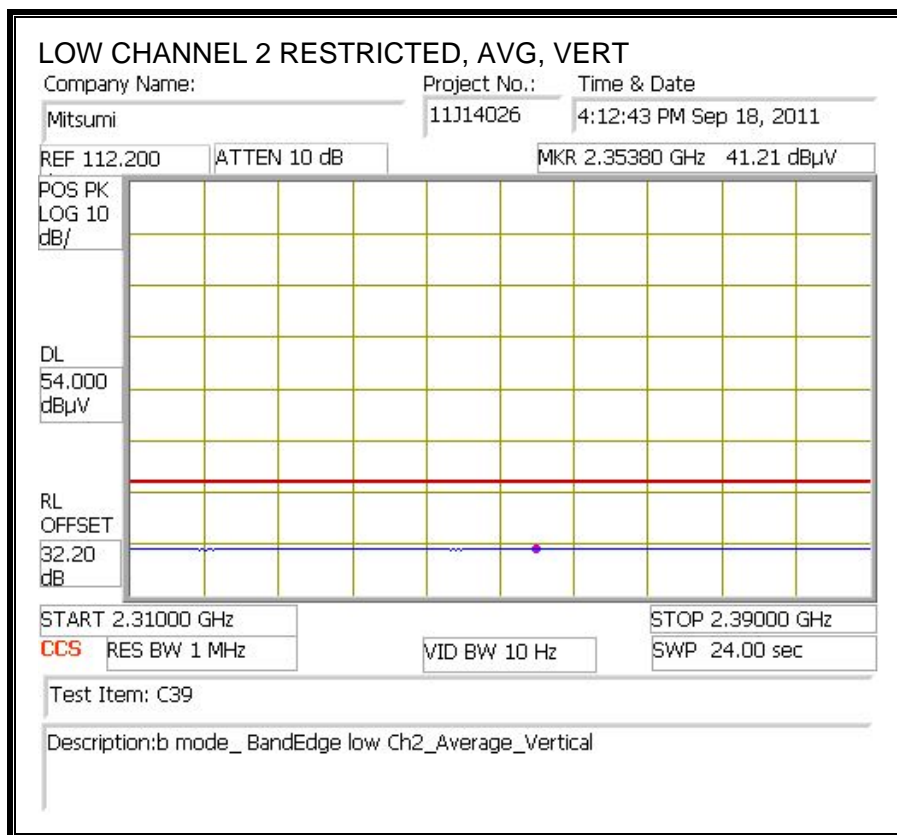
**RESTRICTED BANDEDGE (LOW CHANNEL 2, HORIZONTAL)**





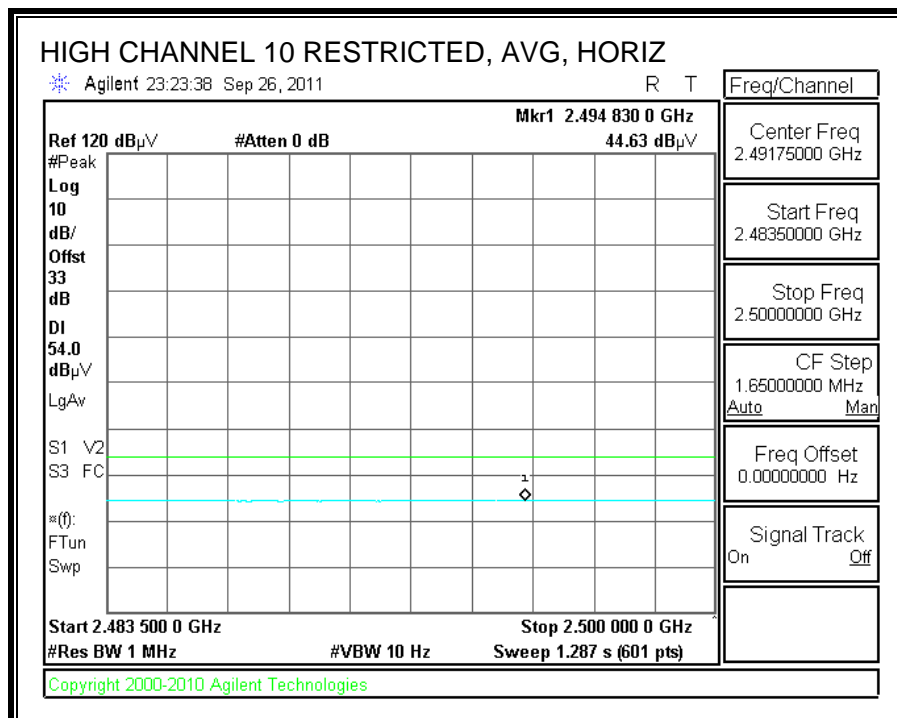
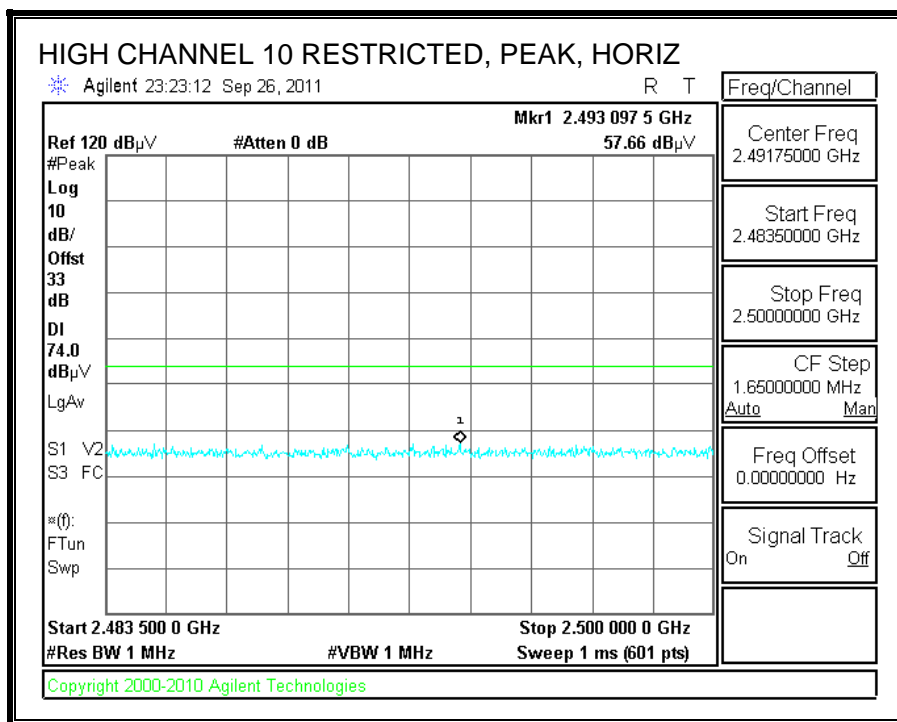
**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**



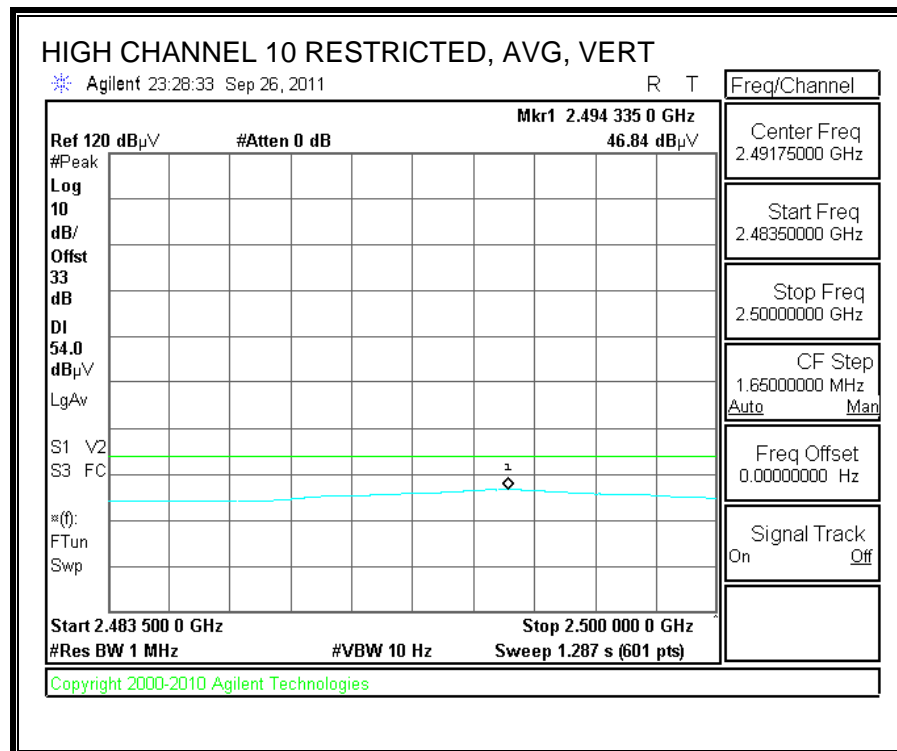
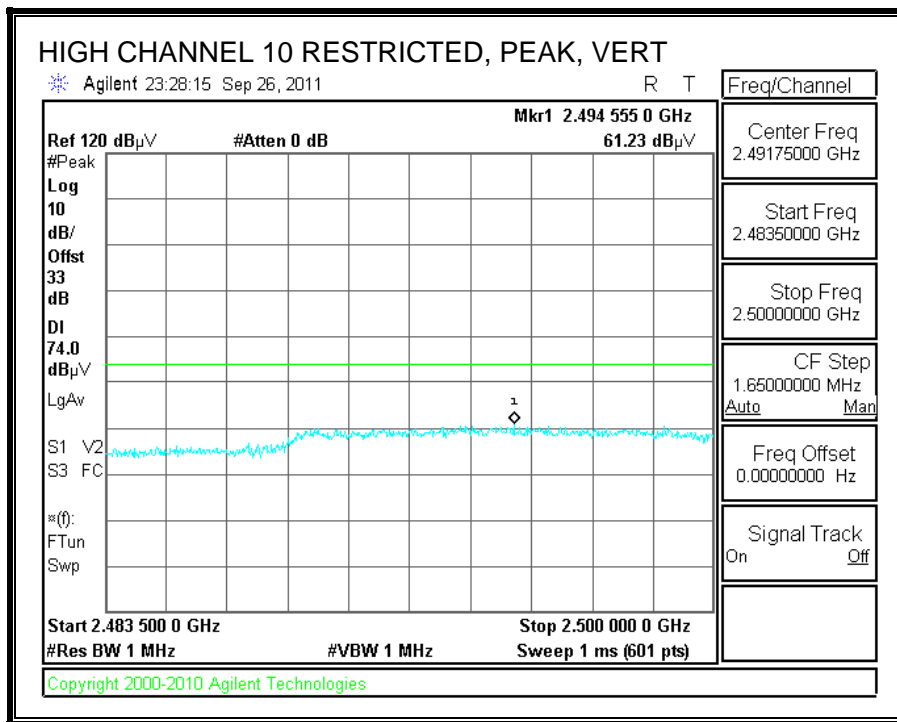




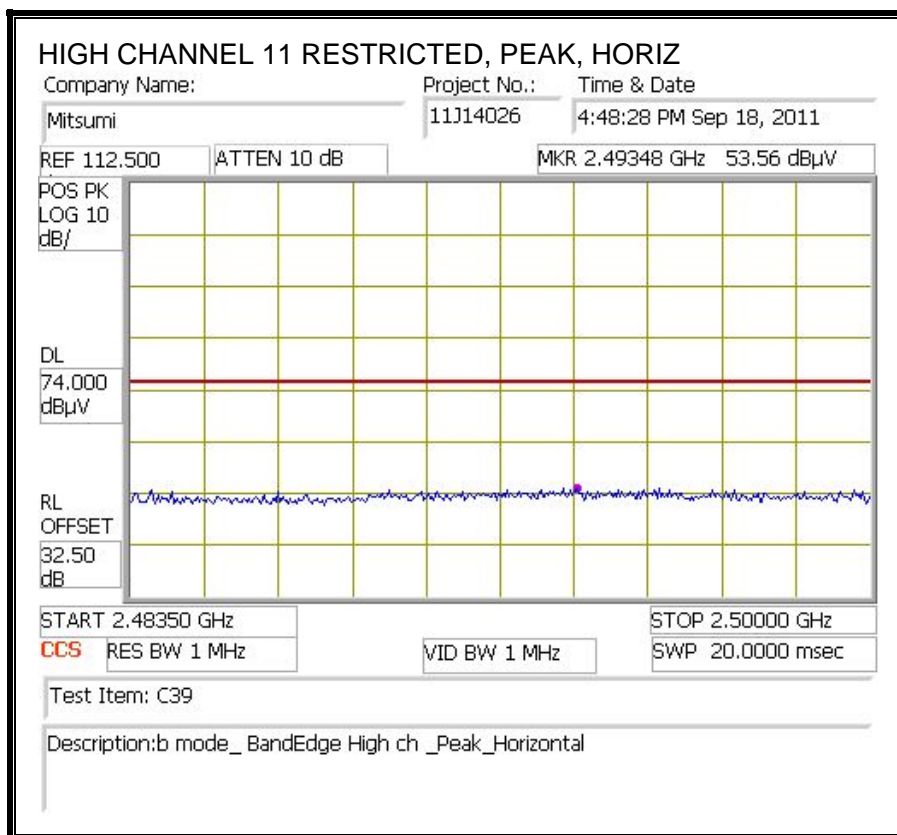
**RESTRICTED BANDEDGE (HIGH CHANNEL 10, HORIZONTAL)**

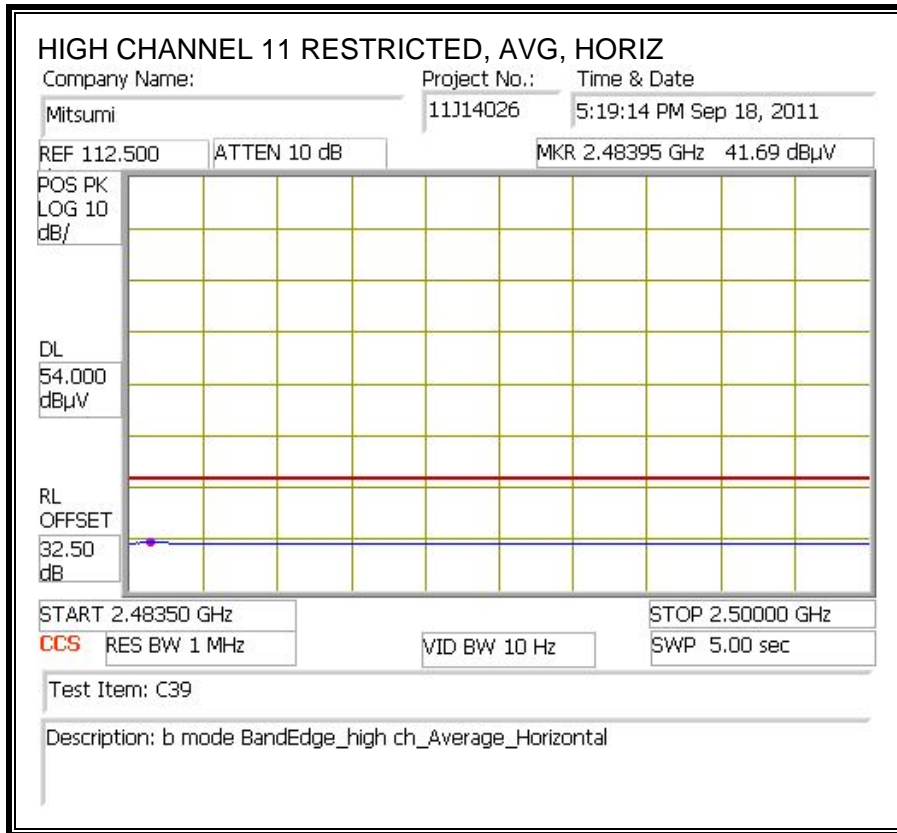


**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**

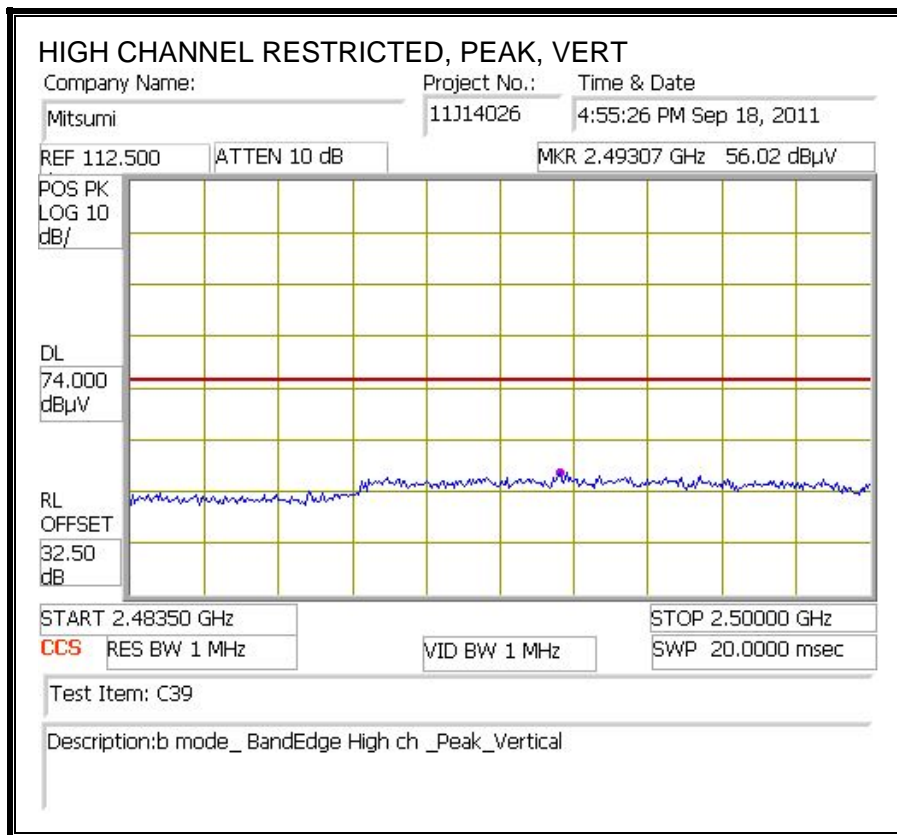


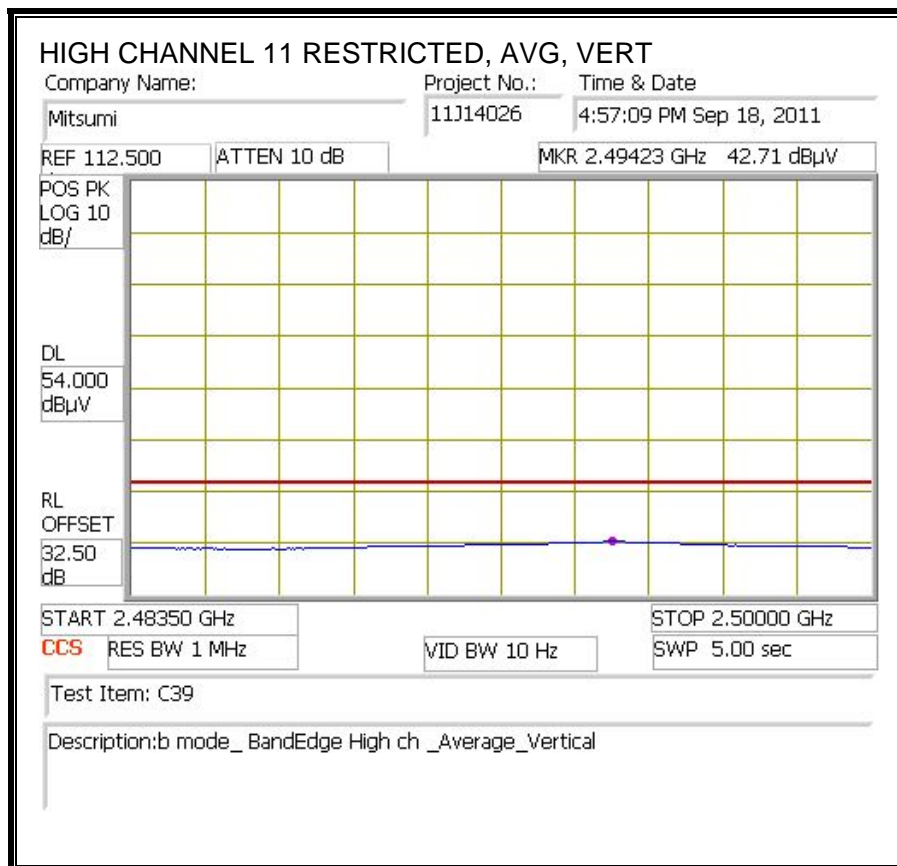
**RESTRICTED BANDEDGE (HIGH CHANNEL 11, HORIZONTAL)**





**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**



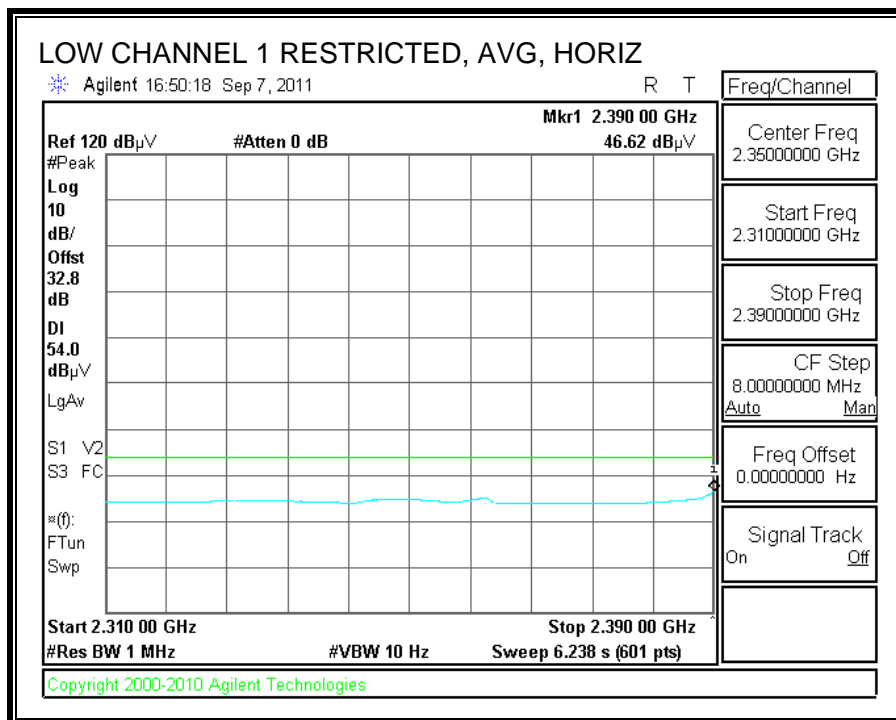
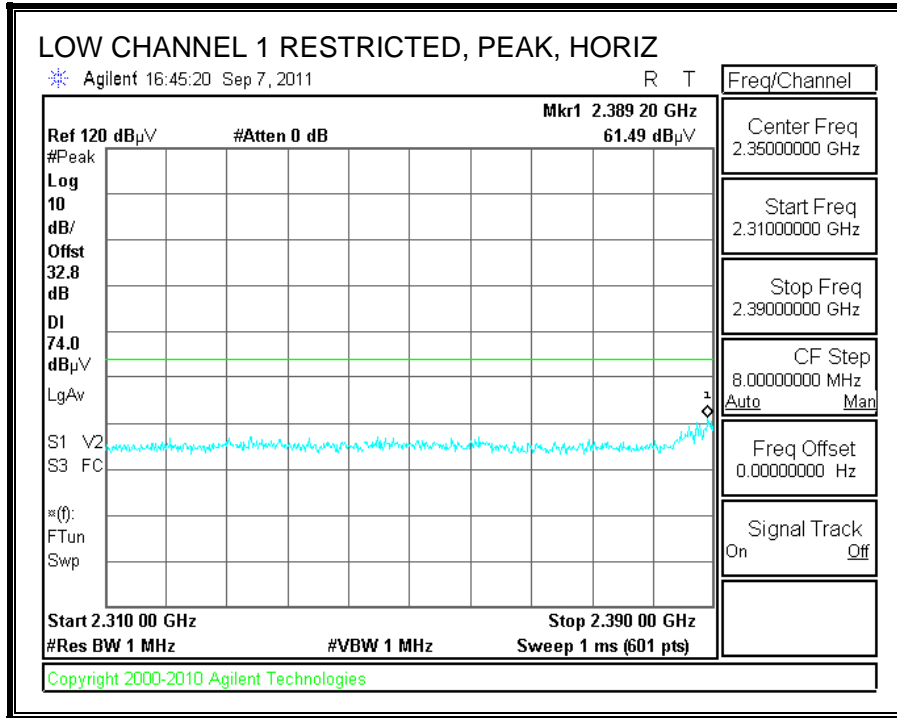


**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Mitsumi															
Project #:		11J14026															
Date:		9/17/2011															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT and Support Laptop															
Mode:		Transmit b mode															
<b>Test Equipment:</b>																	
Horn 1-18GHz				Pre-amplifier 1-26GHz				Pre-amplifier 26-40GHz				Horn > 18GHz				Limit	
T60; S/N: 2238 @3m				T34 HP 8449B								T39; ARA 18-26GHz; S/N:1013				FCC 16.205	
Hi Frequency Cables																	
3' cable 22807700				12' cable 22807600				20' cable 22807500				HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz; VBW=10Hz	
3' cable 22807700				12' cable 22807600				20' cable 22807500						R_001			
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
<b>Low Ch</b>																	
1.200	3.0	57.1	42.9	25.4	3.0	-37.5	0.0	0.0	48.0	33.8	74	54	-26.0	-20.2	V		
4.824	3.0	42.7	31.2	33.9	6.8	-34.1	0.0	0.0	49.3	37.8	74	54	-24.7	-16.2	V		
12.060	3.0	37.1	25.4	39.7	11.9	-32.3	0.0	0.0	56.4	44.8	74	54	-17.6	9.2	Noise floor		
4.824	3.0	40.5	28.6	33.9	6.8	-34.1	0.0	0.0	47.1	35.2	74	54	-26.9	-18.8	H		
12.060	3.0	37.6	25.4	39.7	11.9	-32.3	0.0	0.0	56.9	44.8	74	54	-17.1	9.2	Noise floor		
1.200	3.0	58.6	44.0	25.4	3.0	-37.5	0.0	0.0	49.5	34.9	74	54	-24.5	-19.1	H		
<b>Mid Ch</b>																	
4.874	3.0	44.2	29.1	33.9	6.8	-34.0	0.0	0.0	50.9	35.8	74	54	-23.1	-18.2	V		
7.311	3.0	43.7	31.3	36.6	9.1	-33.1	0.0	0.0	56.3	43.8	74	54	-17.7	-10.2	Noise floor		
4.874	3.0	41.0	30.9	33.9	6.8	-34.0	0.0	0.0	47.7	37.6	74	54	-26.3	-16.4	H		
7.311	3.0	39.2	26.6	36.6	9.1	-33.1	0.0	0.0	51.8	39.2	74	54	-22.2	-14.8	Noise floor		
<b>High Ch</b>																	
4.924	3.0	46.2	32.4	34.0	6.8	-34.0	0.0	0.0	53.0	39.2	74	54	-21.0	-14.8	V		
7.386	3.0	39.7	26.7	36.6	9.1	-33.1	0.0	0.0	52.4	39.4	74	54	21.6	-14.6	Noise floor		
4.924	3.0	44.4	31.2	34.0	6.8	-34.0	0.0	0.0	51.2	38.0	74	54	-22.8	-16.0	H		
7.386	3.0	40.0	26.7	36.6	9.1	-33.1	0.0	0.0	52.6	39.3	74	54	-21.4	-14.7	Noise floor		
Rev. 07.08.11																	
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										

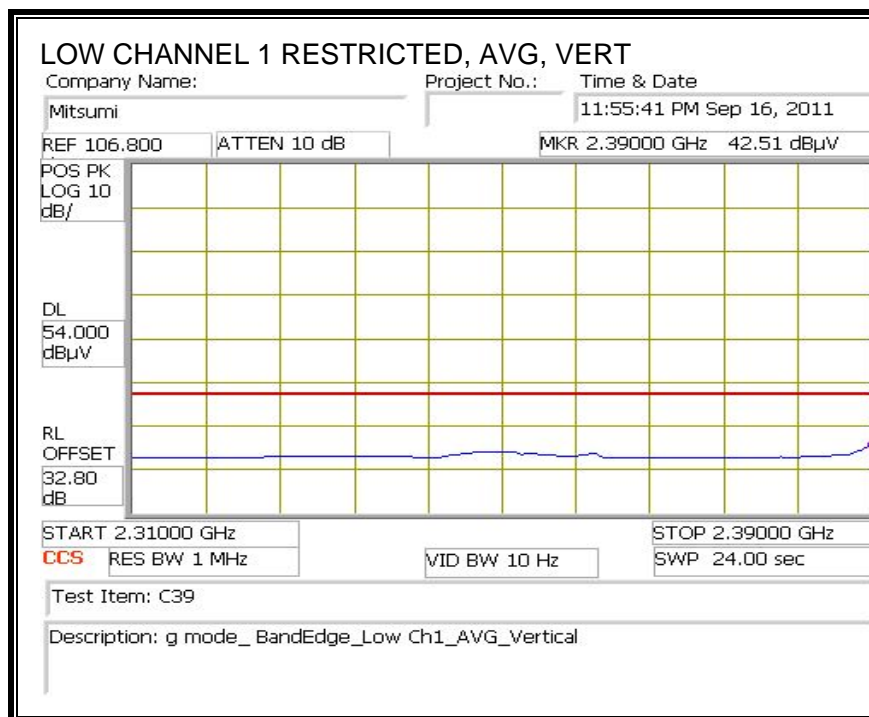
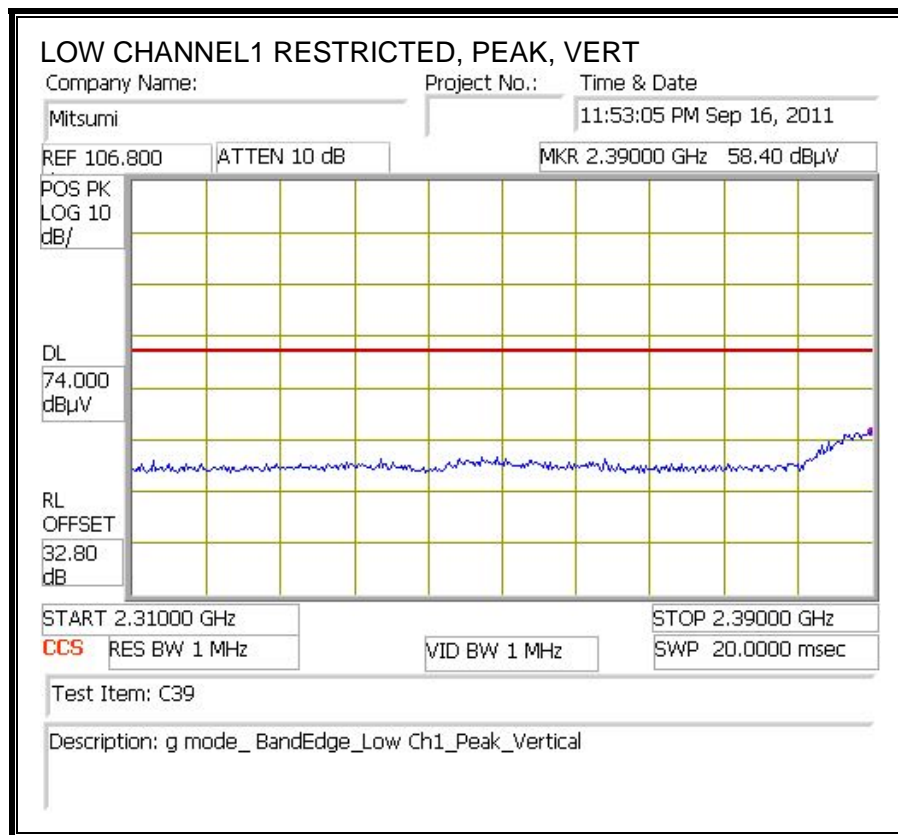
**8.3. TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND**  
**Type A**

**RESTRICTED BANDEDGE (LOW CHANNEL1, HORIZONTAL)**

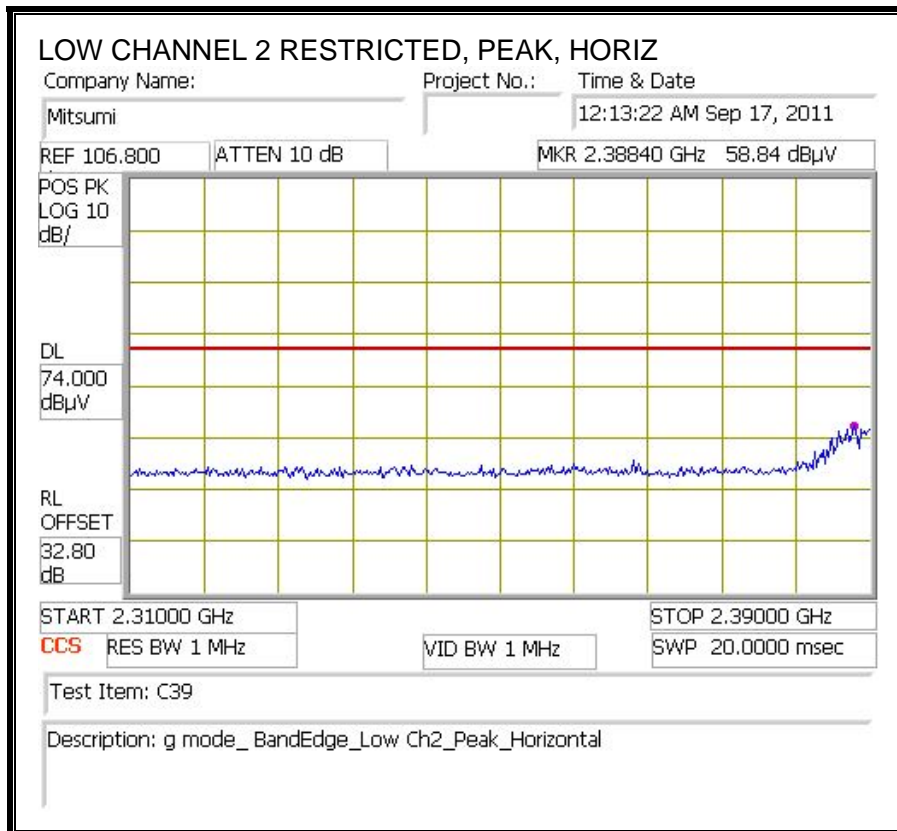


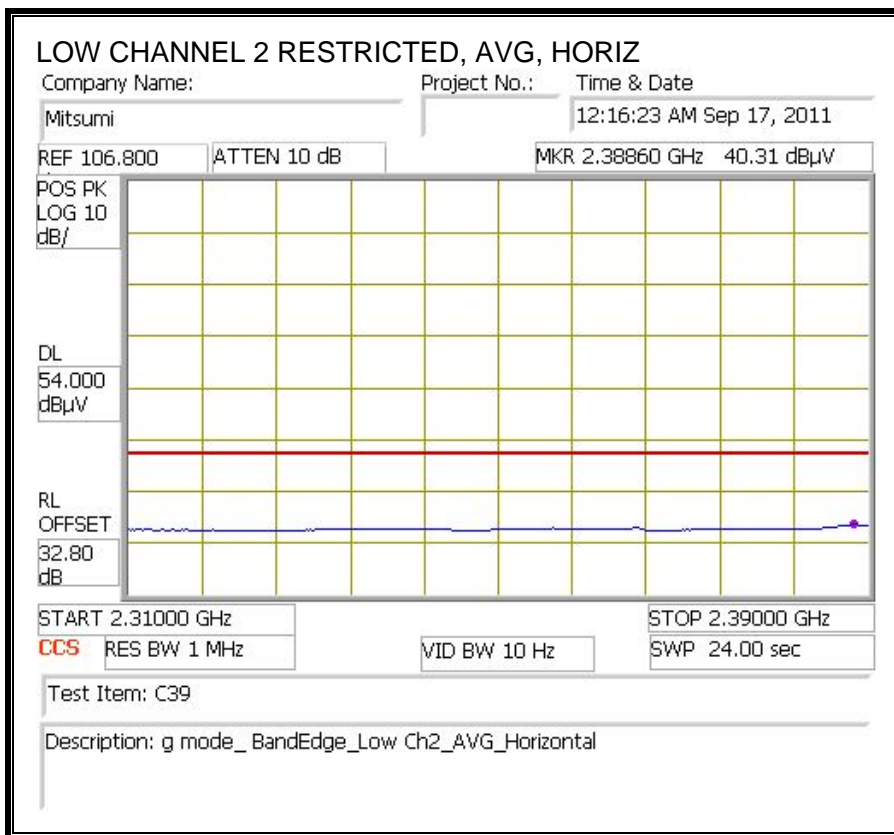


**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**

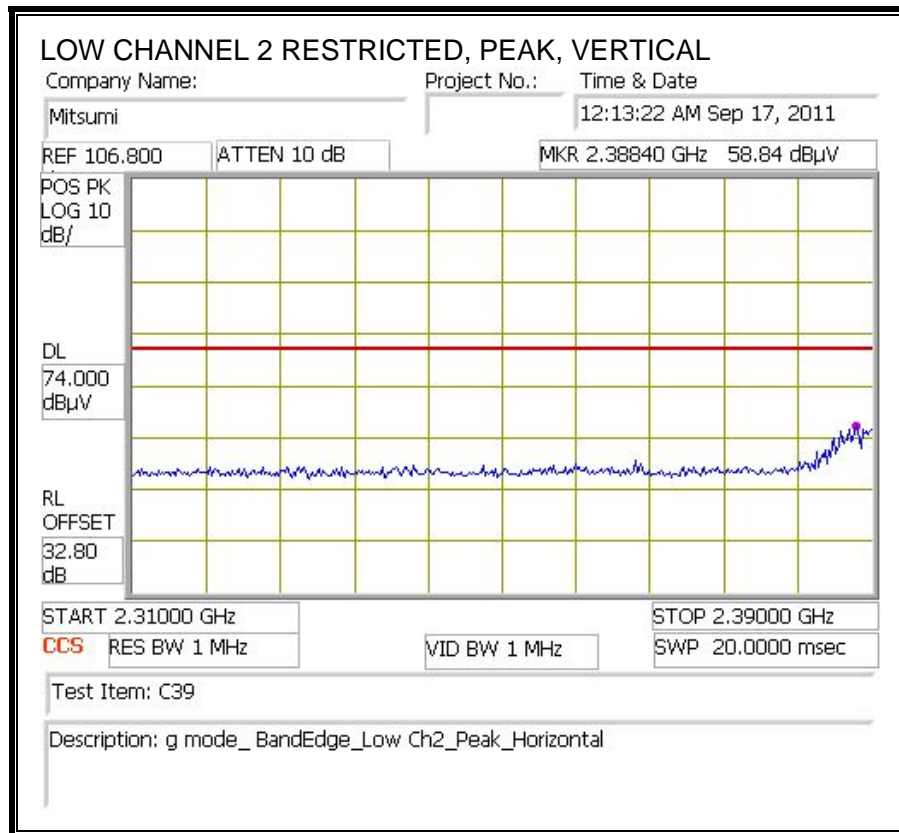


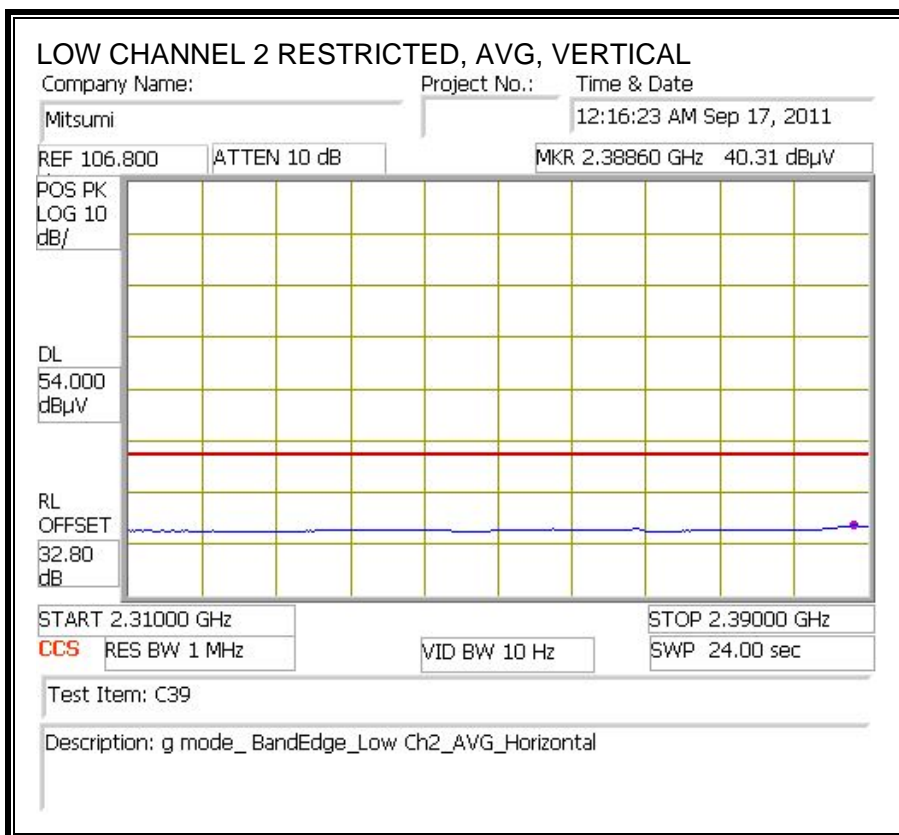
**RESTRICTED BANDEDGE (LOW CHANNEL2, HORIZONTAL)**



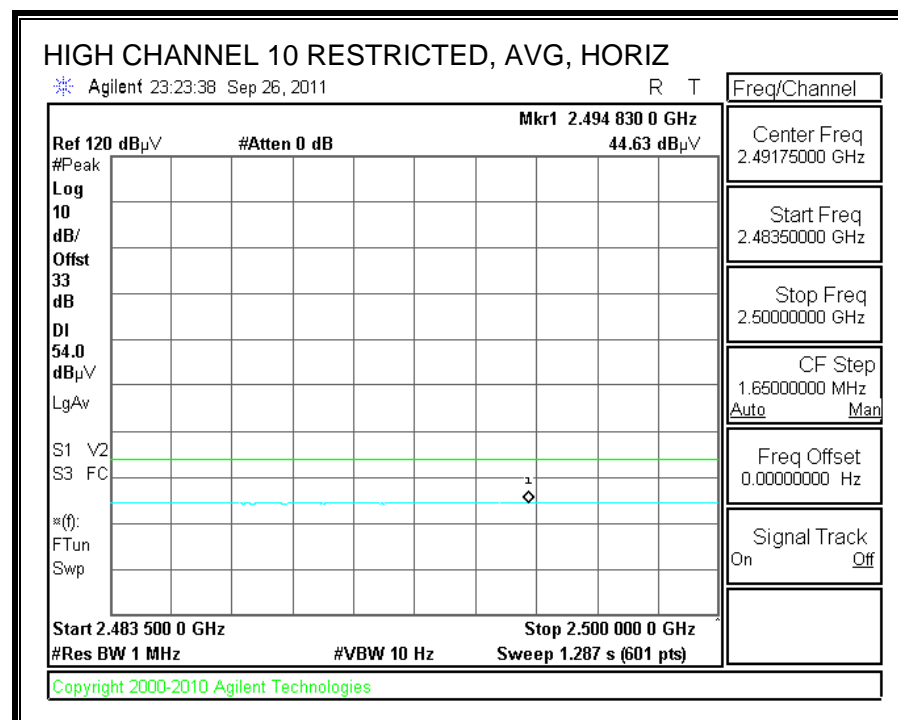
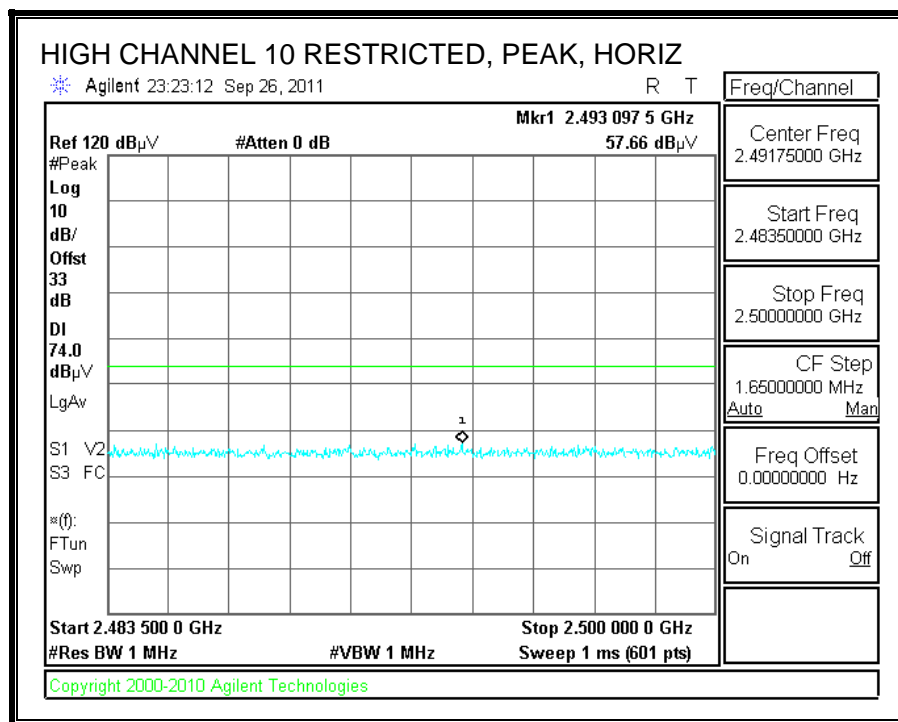


**RESTRICTED BANDEDGE (LOW CHANNEL2, VERTICAL)**

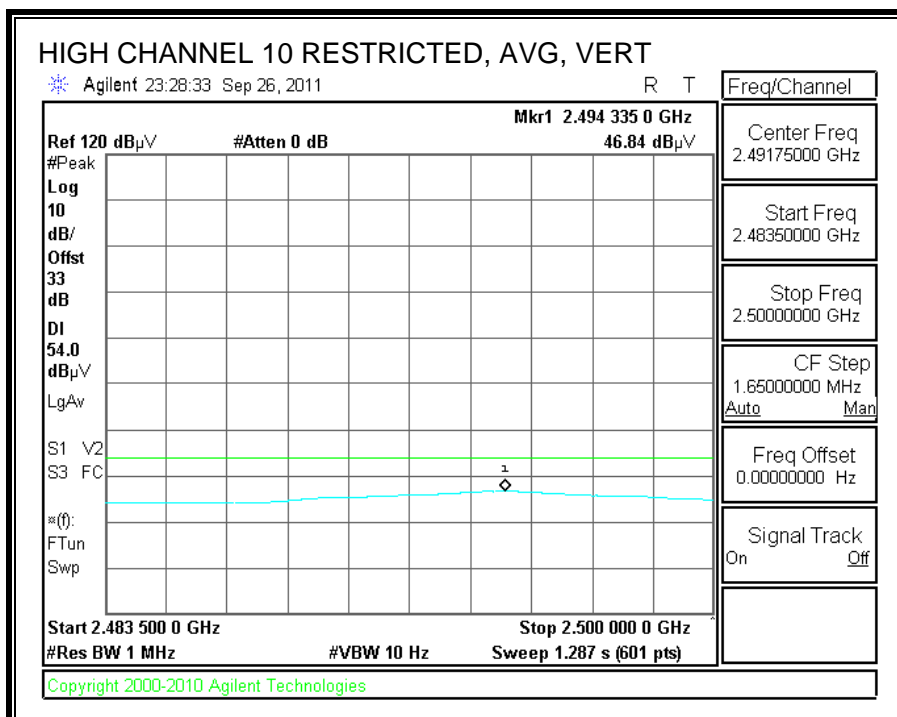
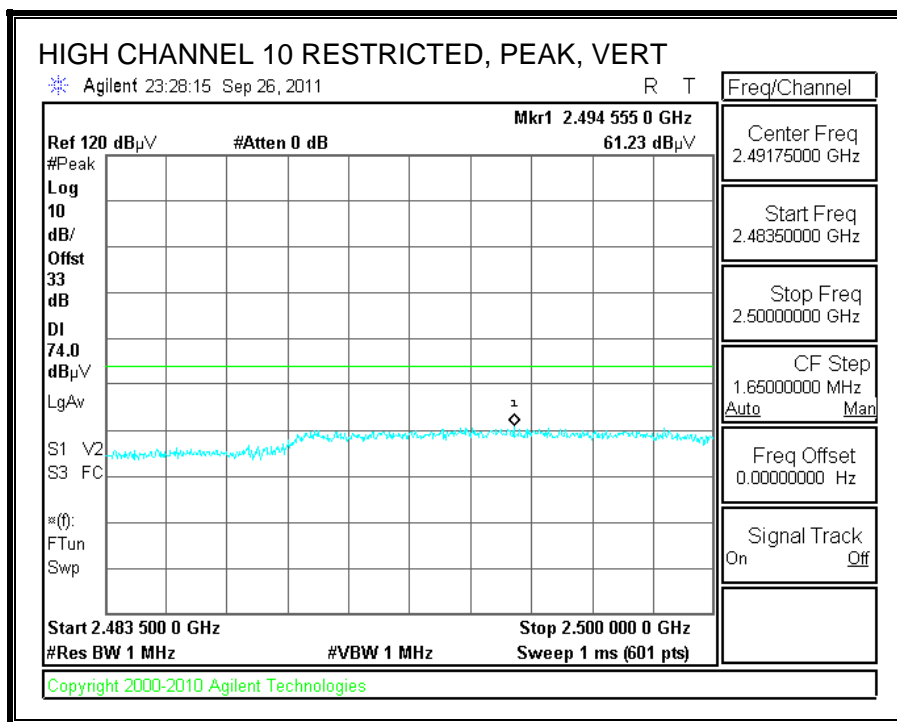




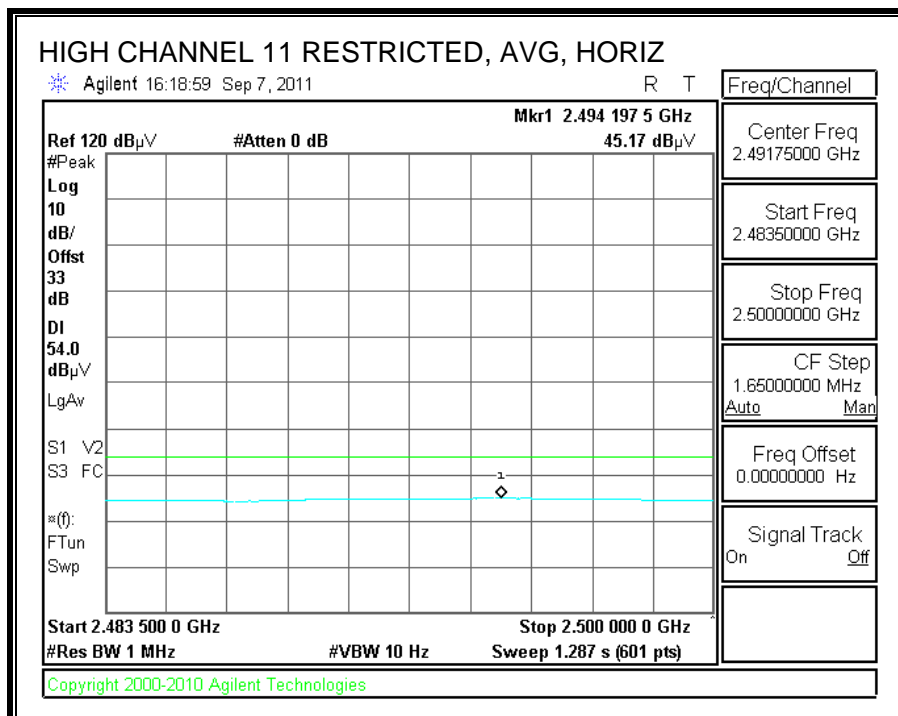
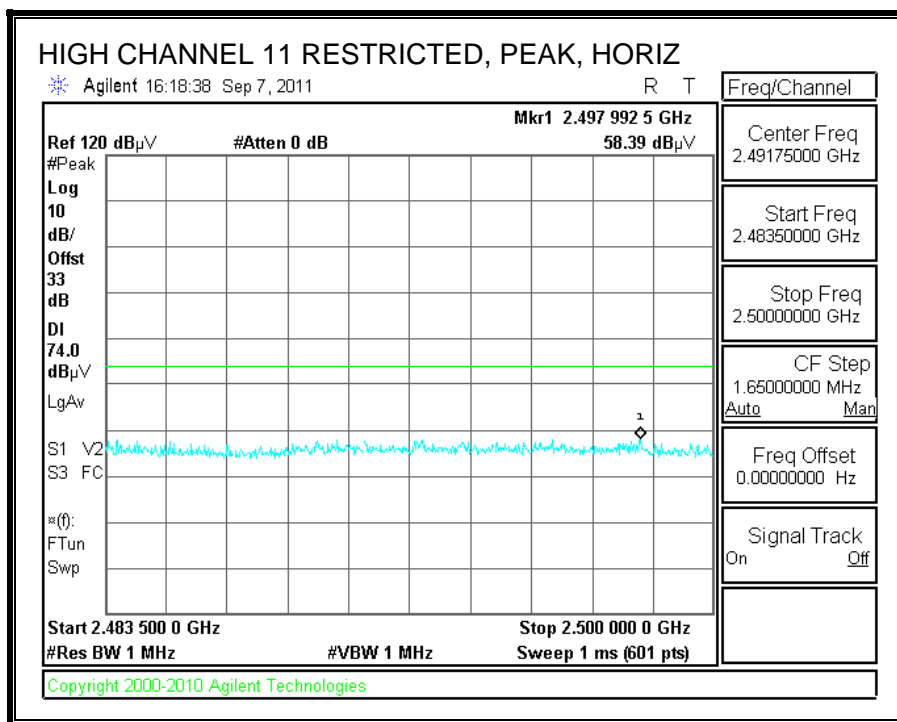
**RESTRICTED BANDEDGE (HIGH CHANNEL10, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**

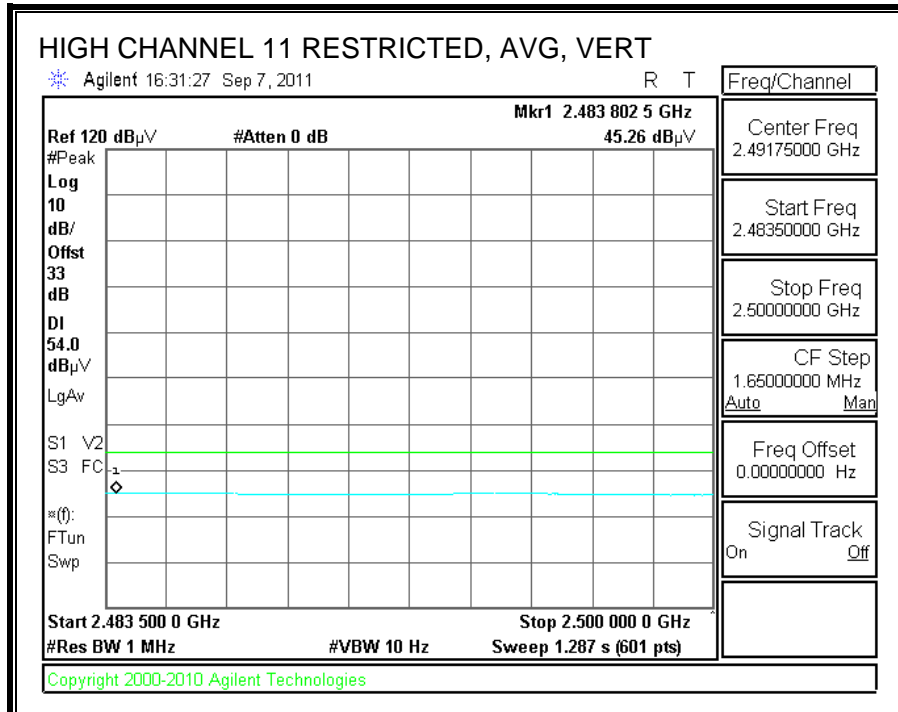
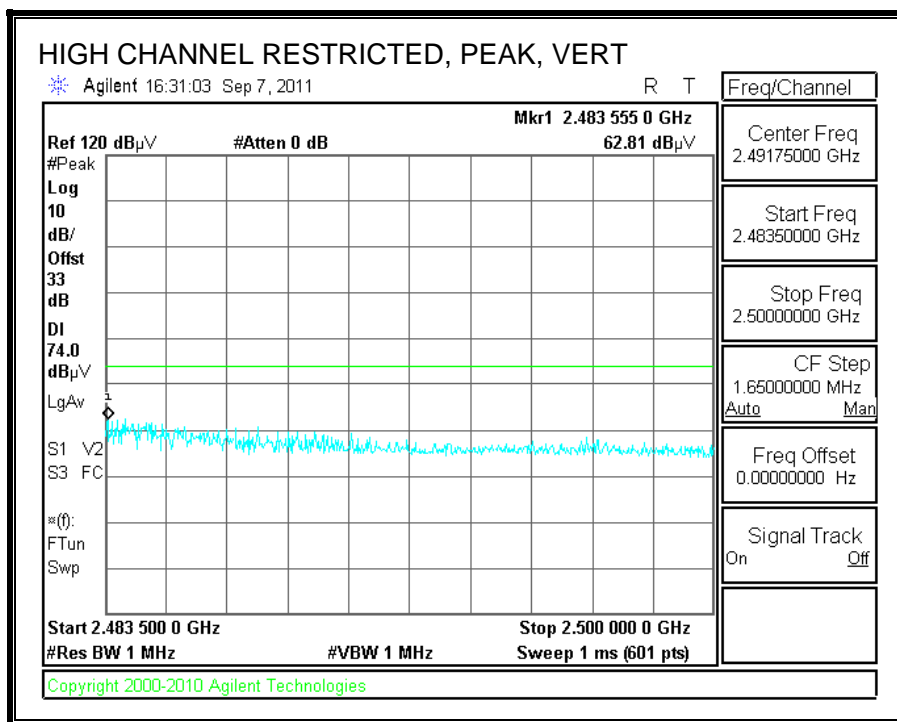


**RESTRICTED BANDEDGE (HIGH CHANNEL11, HORIZONTAL)**





**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**

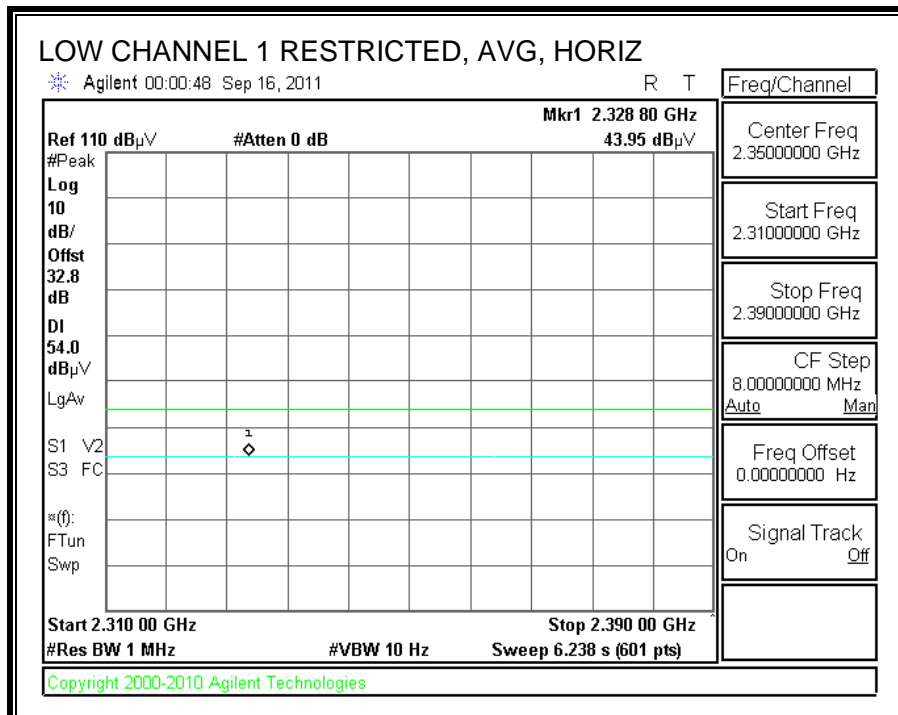
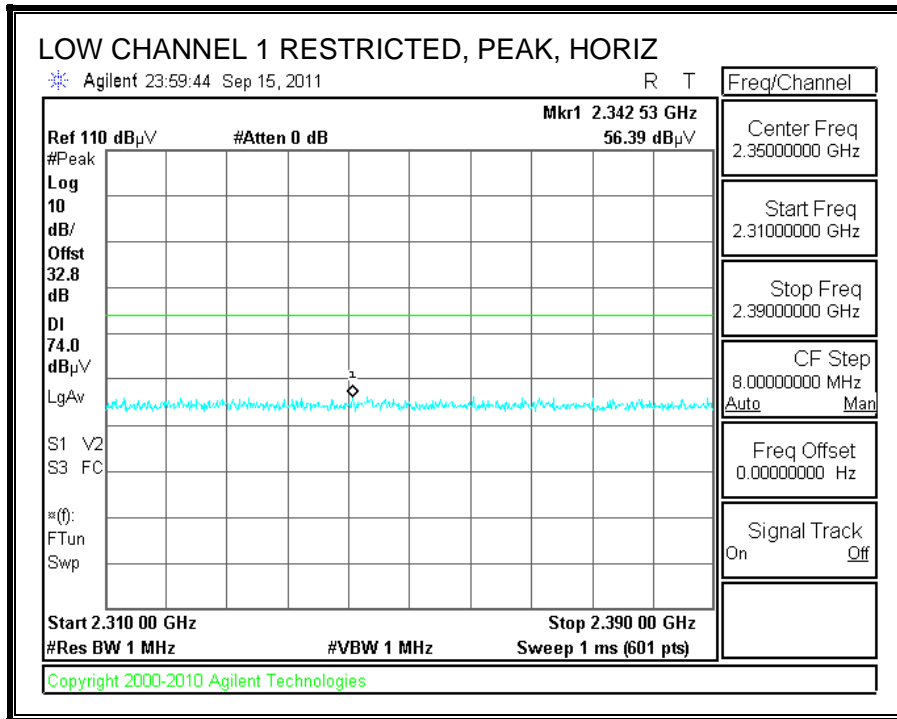


**HARMONICS AND SPURIOUS EMISSIONS**

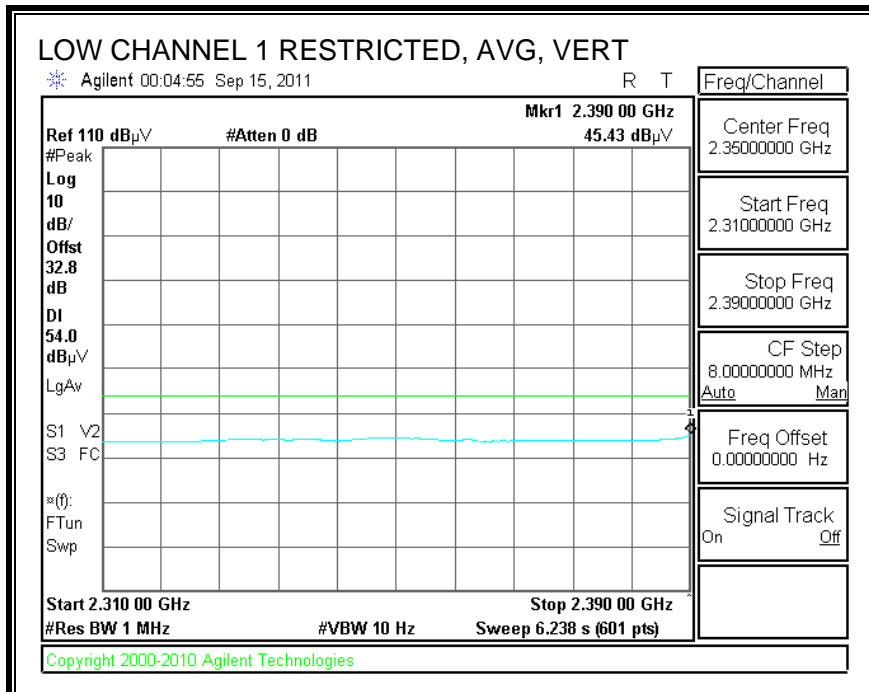
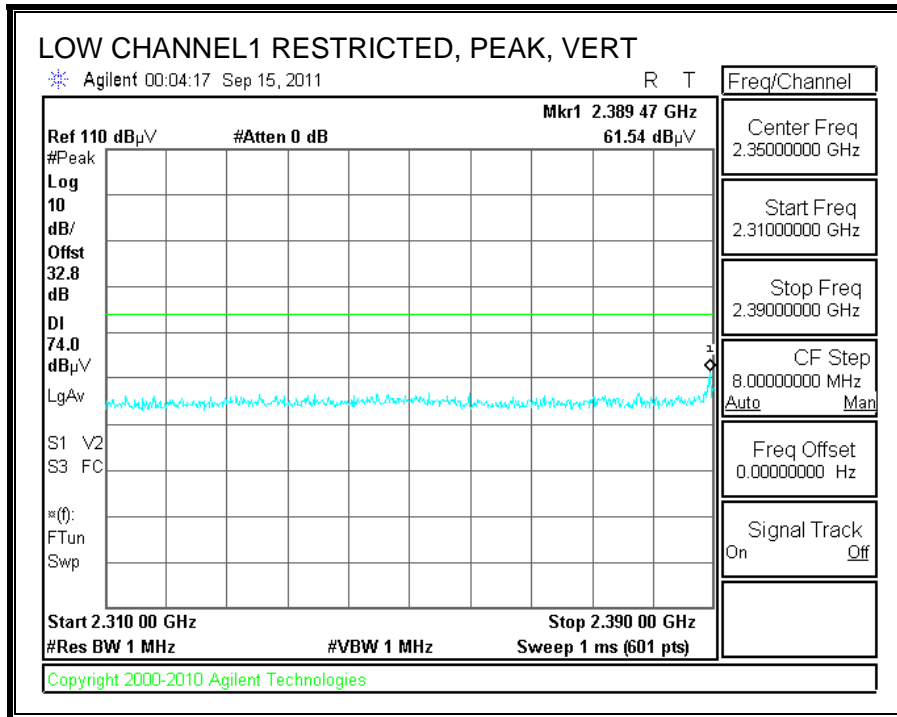
High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Mitsumi															
Project #:		11J14026															
Date:		9/7/2011															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT and Support Laptop															
Mode:		Transmit mode															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T34 HP 8449B						T39; ARA 18-26GHz; S/N:1013			FCC 15.205					
<b>Hi Frequency Cables</b>																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz		
3' cable 22807700			12' cable 22807600			20' cable 22807500						R_001			Average Measurements RBW=1MHz ; VBW=10Hz		
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
<b>Low Ch</b>																	
1.200	3.0	48.7	35.3	25.4	3.0	-37.5	0.0	0.0	39.6	26.2	74	54	-34.4	-27.8	Y		
4.824	3.0	38.4	26.6	33.9	6.8	-34.1	0.0	0.0	45.0	33.2	74	54	-29.0	-20.8	Y		
12.060	3.0	34.8	22.8	39.7	11.9	-32.3	0.0	0.0	54.2	42.2	74	54	-19.8	-11.8	Noise floor		
4.824	3.0	37.3	25.4	33.9	6.8	-34.1	0.0	0.0	43.9	32.0	74	54	-30.1	-22.0	H		
12.060	3.0	34.2	22.3	39.7	11.9	-32.3	0.0	0.0	53.6	41.7	74	54	-20.4	-12.3	Noise floor		
1.200	3.0	55.6	35.5	25.4	3.0	-37.5	0.0	0.0	46.5	26.4	74	54	-27.5	-27.6	H		
<b>Mid Ch</b>																	
4.874	3.0	42.5	27.8	33.9	6.8	-34.0	0.0	0.0	49.2	34.5	74	54	-24.8	-19.5	Y		
7.311	3.0	35.3	23.1	36.6	9.1	-33.1	0.0	0.0	47.9	35.7	74	54	-26.1	-18.3	Noise floor		
4.874	3.0	38.6	24.6	33.9	6.8	-34.0	0.0	0.0	45.3	31.3	74	54	-28.7	-22.7	H		
7.311	3.0	36.2	23.2	36.6	9.1	-33.1	0.0	0.0	48.8	35.8	74	54	-25.2	-18.2	Noise floor		
<b>High Ch</b>																	
4.924	3.0	40.7	27.5	34.0	6.8	-34.0	0.0	0.0	47.4	34.3	74	54	-26.6	-19.7	Y		
7.386	3.0	36.9	23.6	36.6	9.1	-33.1	0.0	0.0	49.6	36.2	74	54	-24.4	-17.8	Noise floor		
4.924	3.0	38.5	25.4	34.0	6.8	-34.0	0.0	0.0	45.3	32.2	74	54	-28.7	-21.8	H		
7.386	3.0	36.3	23.5	36.6	9.1	-33.1	0.0	0.0	49.0	36.2	74	54	-25.0	-17.8	Noise floor		
Rev. 07.08.11																	
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										

**Type B**

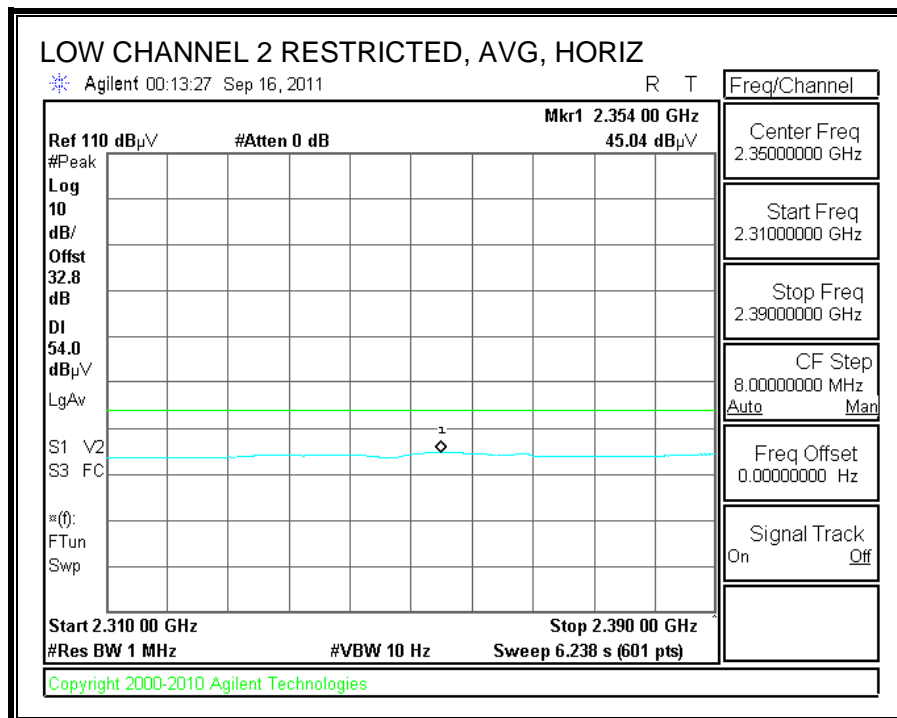
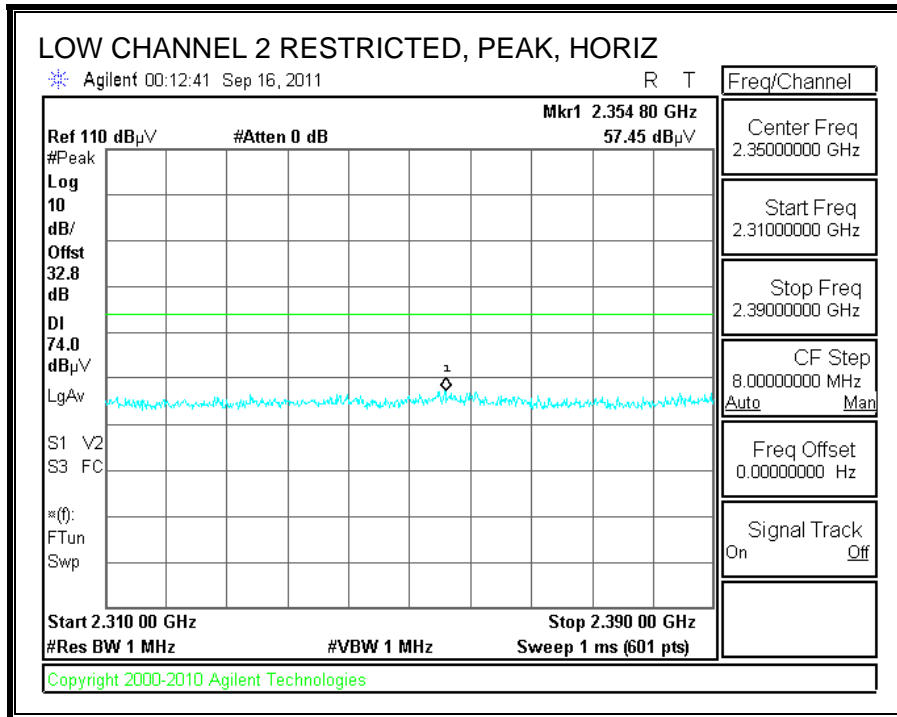
**RESTRICTED BANDEDGE (LOW CHANNEL1, HORIZONTAL)**



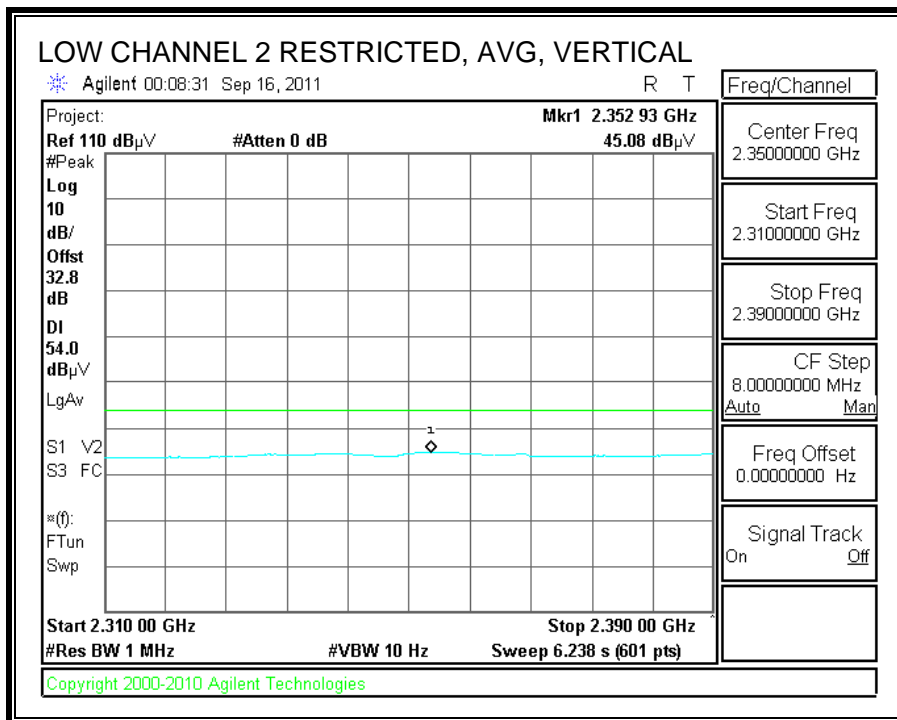
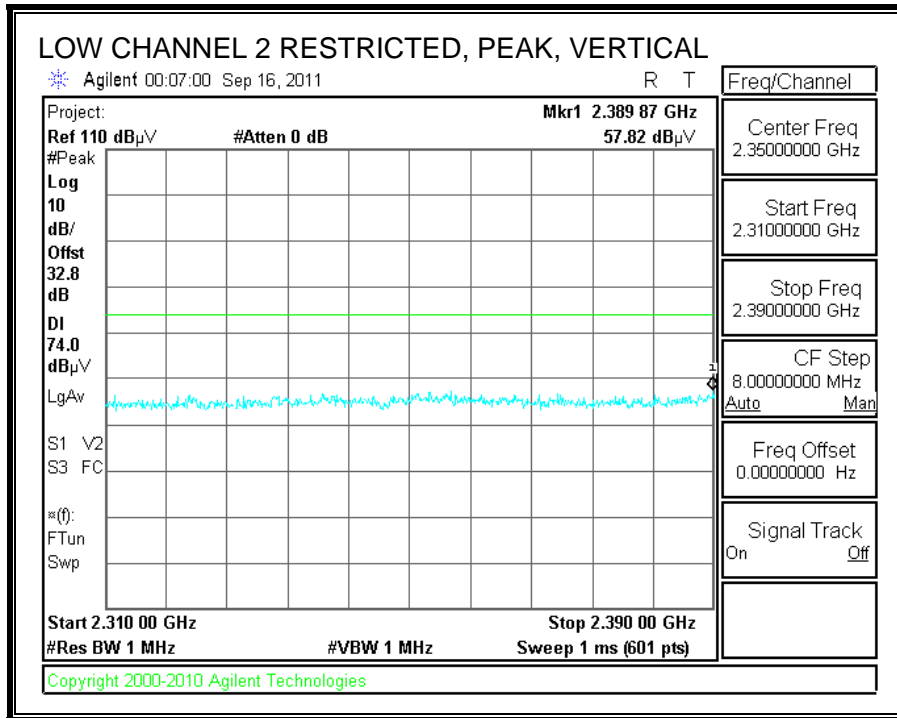
**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**



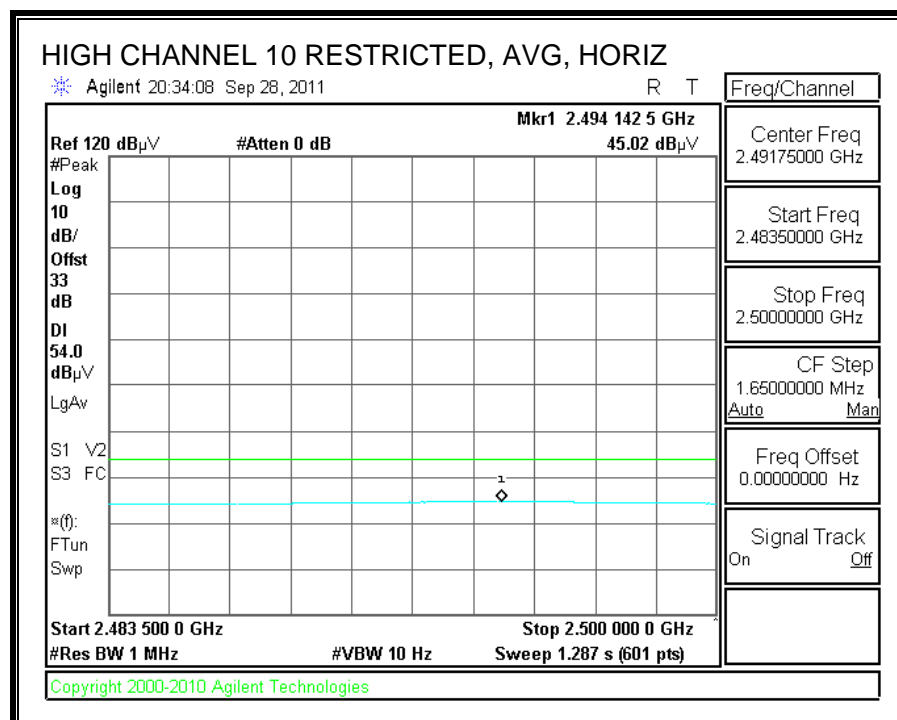
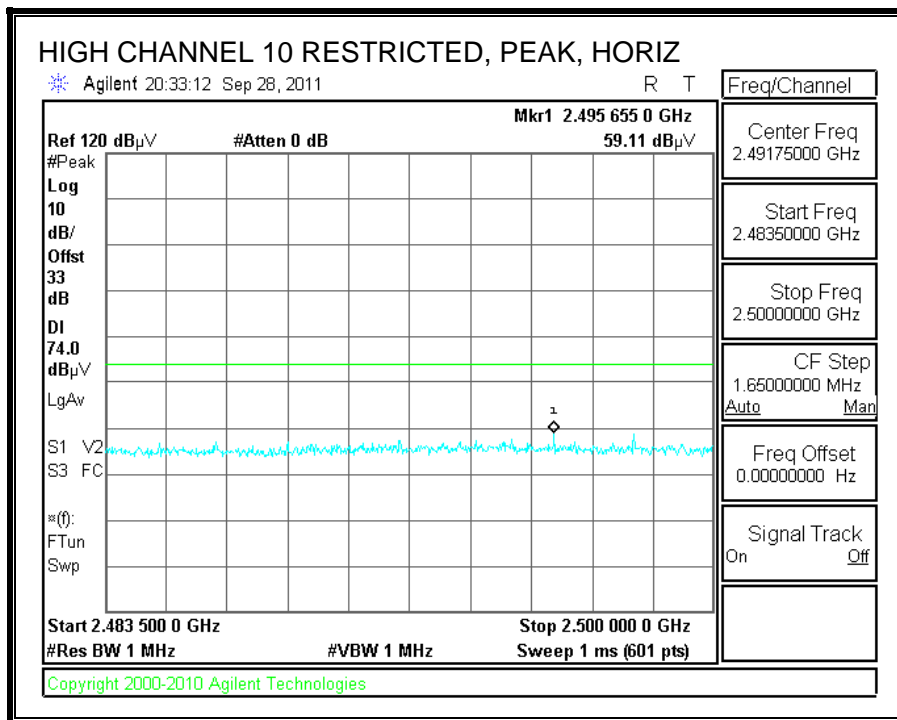
**RESTRICTED BANDEDGE (LOW CHANNEL2, HORIZONTAL)**



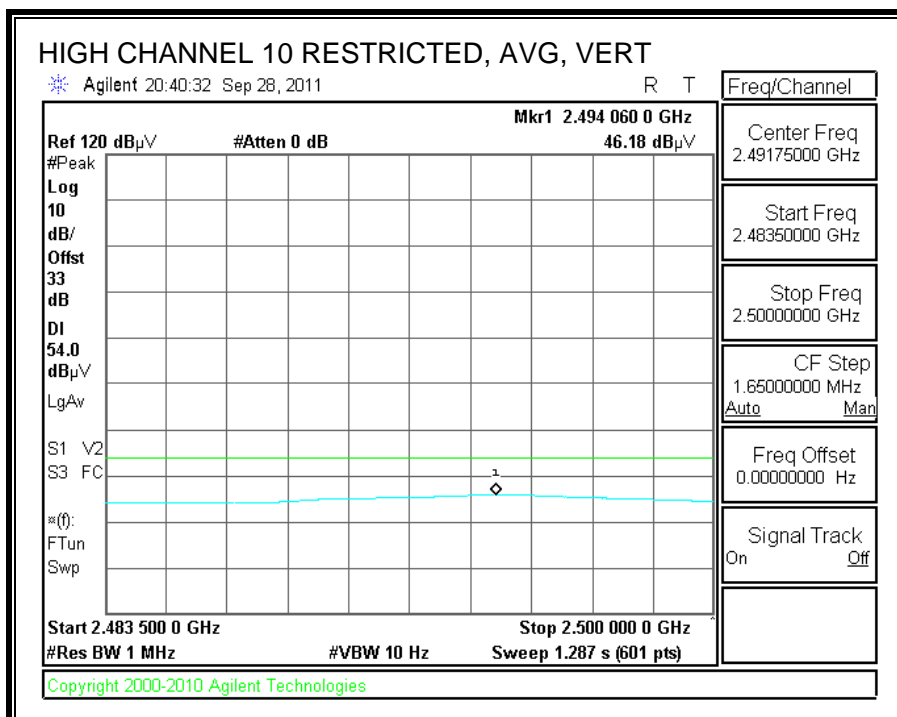
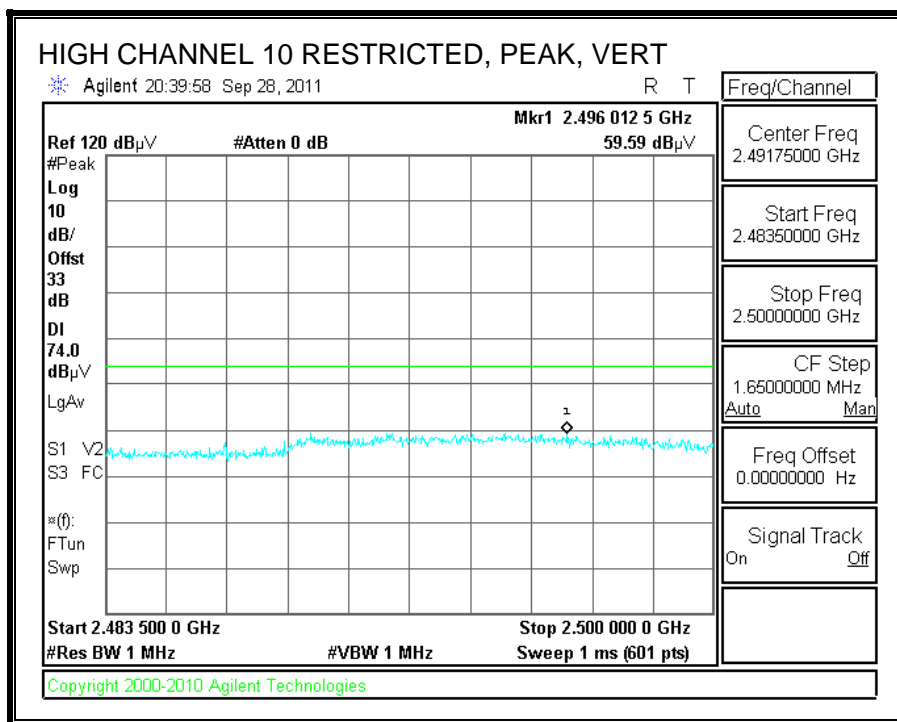
**RESTRICTED BANDEDGE (LOW CHANNEL2, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL10, HORIZONTAL)**

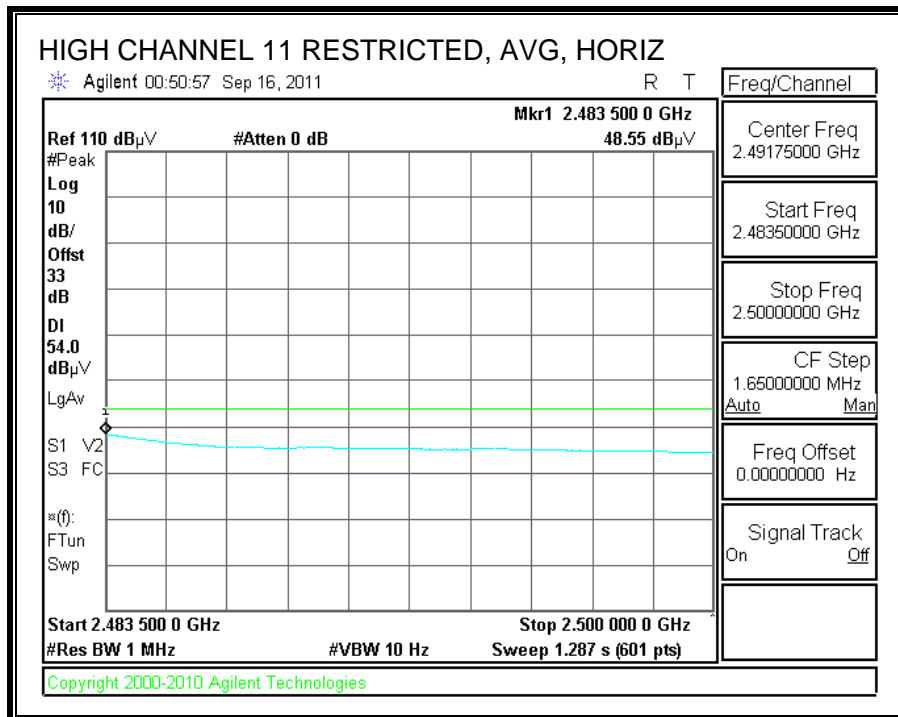
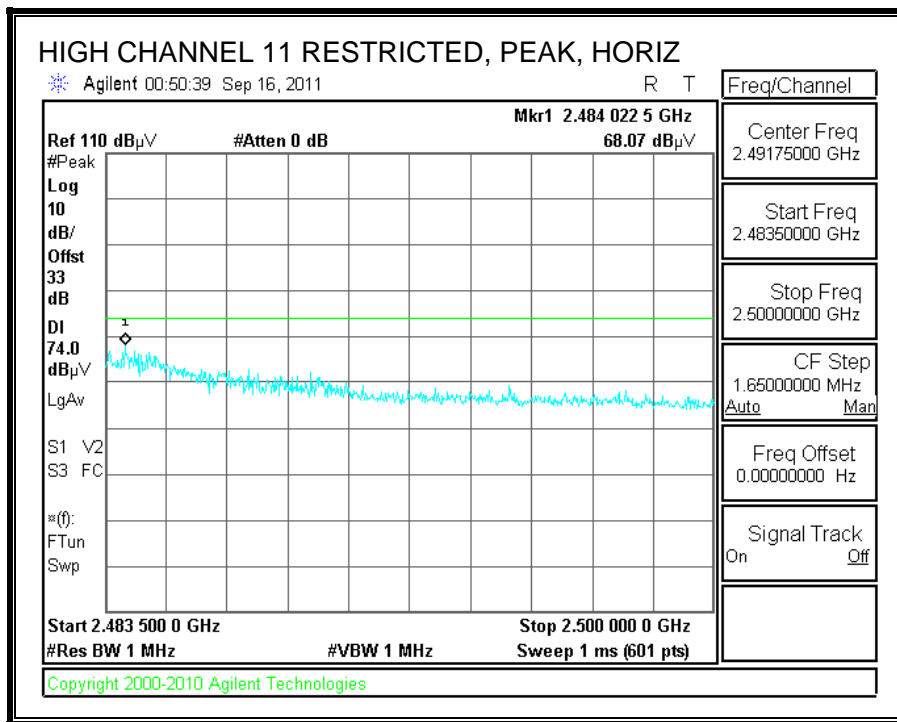


**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**

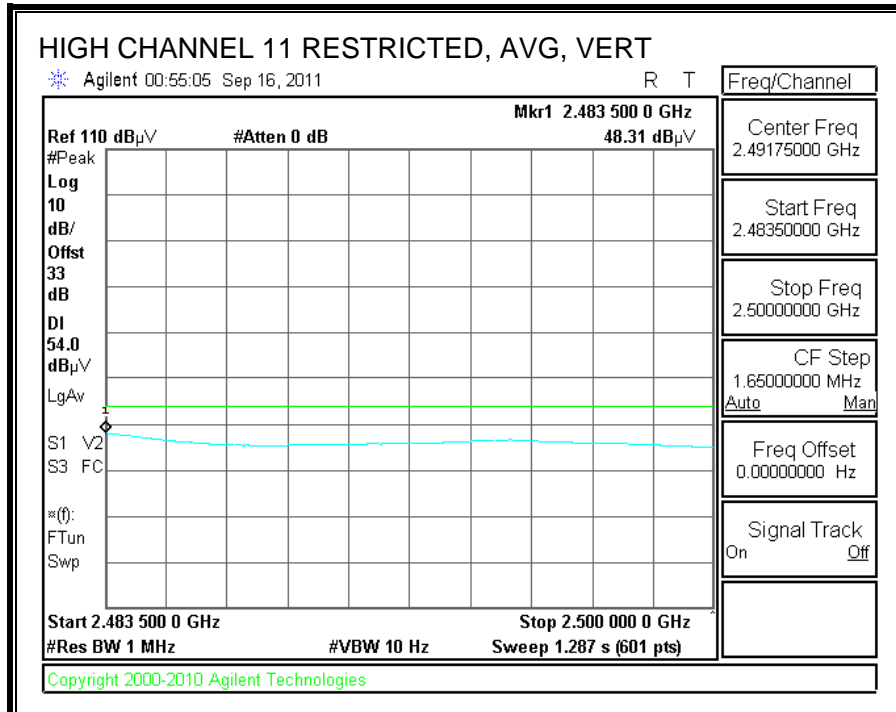
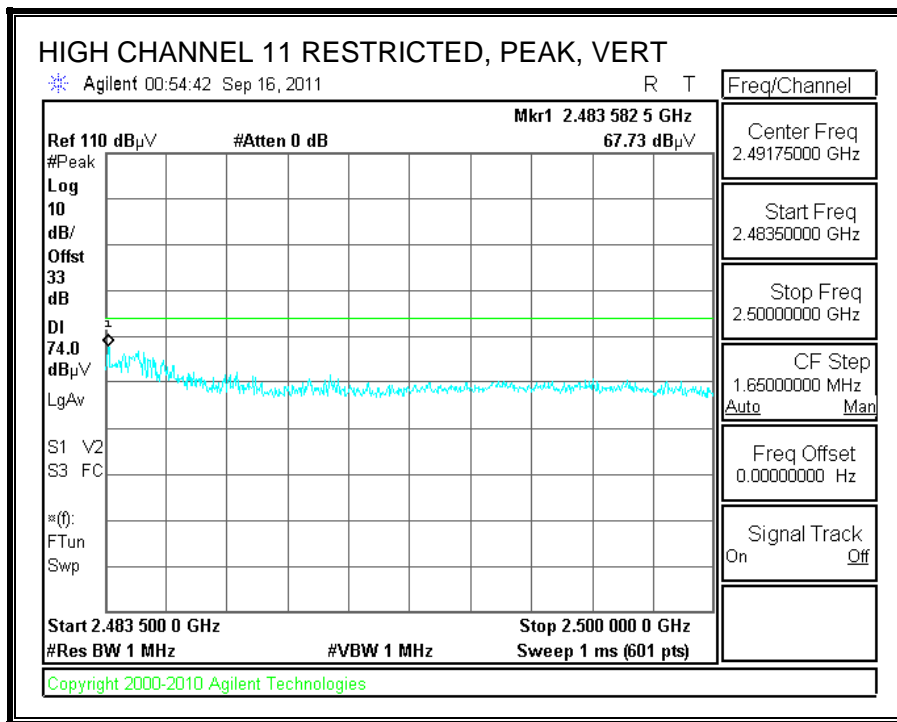




**RESTRICTED BANDEDGE (HIGH CHANNEL11, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/17/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT Type B and Remote Support Laptop  
 Mode: Transmit g mode

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

<b>3' cable 22807700</b>	<b>12' cable 22807600</b>	<b>20' cable 22807500</b>	<b>HPF</b>	<b>Reject Filter</b>	<b>Peak Measurements</b> RBW=VBW=1MHz
3' cable 22807700	12' cable 22807600	20' cable 22807600		R_001	<b>Average Measurements</b> RBW=1MHz ; VBW=10Hz

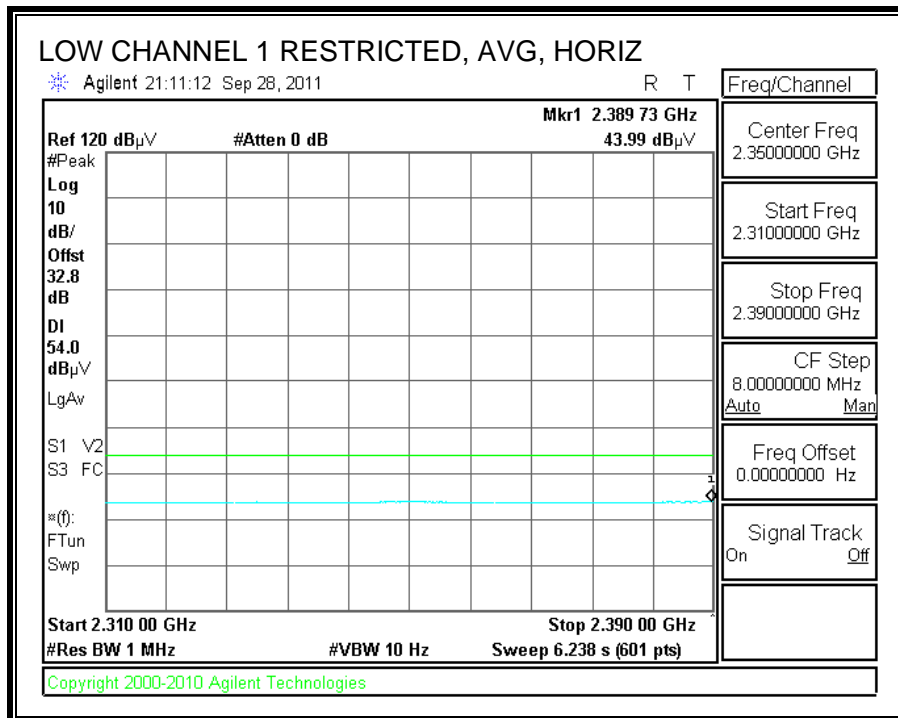
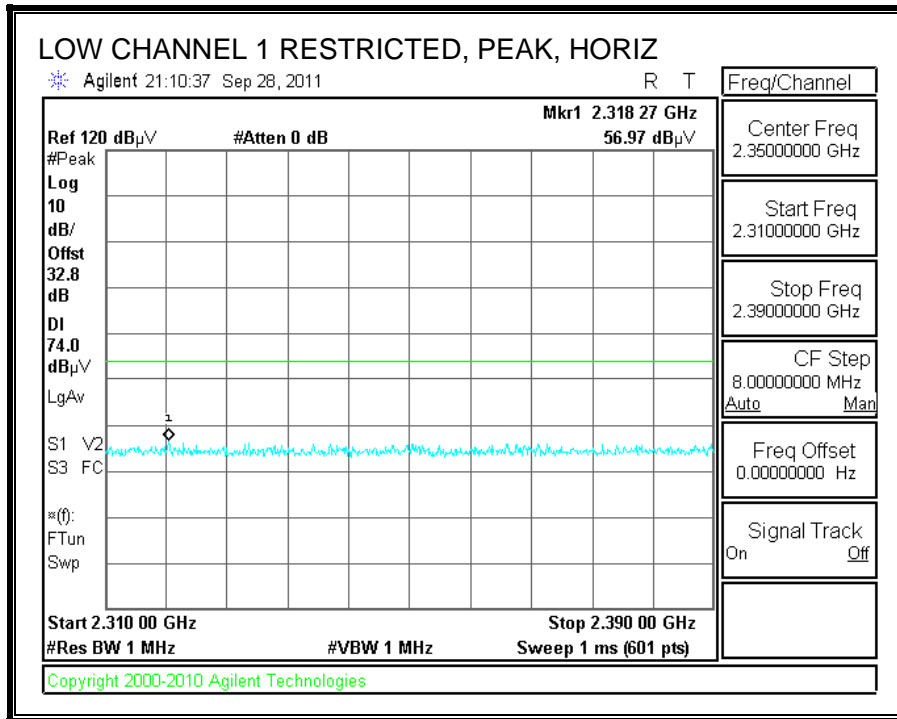
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
1.200	3.0	55.7	42.1	25.4	3.0	-37.5	0.0	0.0	46.6	33.0	74	54	-27.4	-21.0	V
4.824	3.0	41.3	28.7	33.9	6.8	-34.1	0.0	0.0	47.9	35.3	74	54	-26.1	-18.7	V
12.060	3.0	37.3	25.3	39.7	11.9	-32.3	0.0	0.0	56.7	44.7	74	54	-17.3	-9.3	Noise floor
4.824	3.0	40.4	26.4	33.9	6.8	-34.1	0.0	0.0	47.0	33.0	74	54	-27.0	-21.0	H
12.060	3.0	37.5	25.7	39.7	11.9	-32.3	0.0	0.0	56.9	45.1	74	54	-17.1	-8.9	Noise floor
1.200	3.0	58.2	42.9	25.4	3.0	-37.5	0.0	0.0	49.1	33.8	74	54	-24.9	-20.2	H
<b>Mid Ch</b>															
4.874	3.0	45.4	30.4	33.9	6.8	-34.0	0.0	0.0	52.1	37.1	74	54	-21.9	-16.9	V
7.311	3.0	43.3	30.4	36.6	9.1	-33.1	0.0	0.0	55.8	43.0	74	54	-18.2	-11.0	V
4.874	3.0	43.5	30.2	33.9	6.8	-34.0	0.0	0.0	50.2	36.9	74	54	-23.8	-17.1	H
7.311	3.0	40.3	26.5	36.6	9.1	-33.1	0.0	0.0	52.9	39.0	74	54	-21.1	-15.0	Noise floor
<b>High Ch</b>															
4.924	3.0	45.9	32.5	34.0	6.8	-34.0	0.0	0.0	52.7	39.3	74	54	-21.3	-14.7	V
7.386	3.0	45.9	33.6	36.6	9.1	-33.1	0.0	0.0	58.5	46.2	74	54	-15.5	-7.8	V
4.924	3.0	43.7	31.3	34.0	6.8	-34.0	0.0	0.0	50.5	38.1	74	54	-23.5	-15.9	H
7.386	3.0	40.4	28.7	36.6	9.1	-33.1	0.0	0.0	53.0	41.3	74	54	-21.0	-12.7	H

Rev. 07.08.11

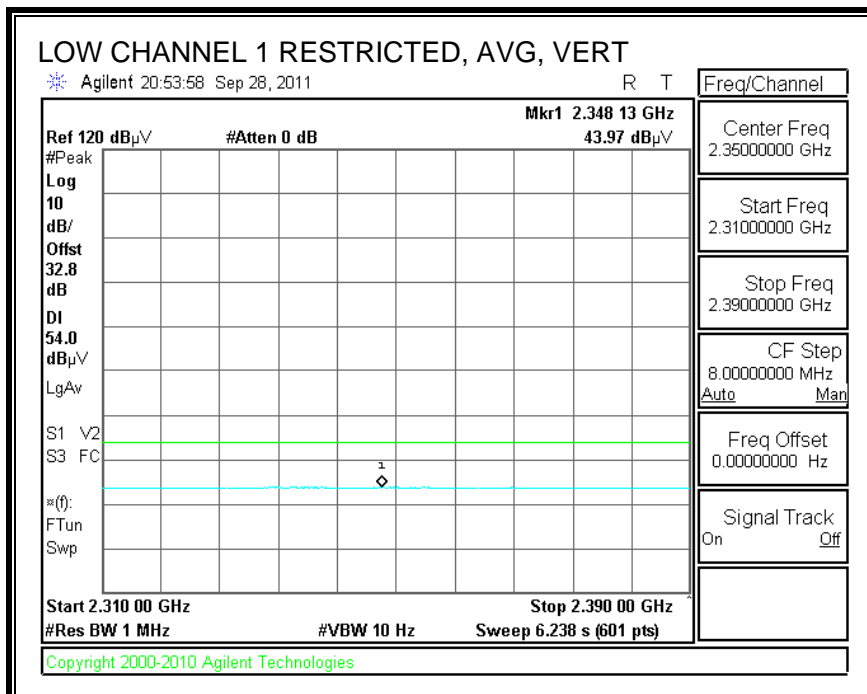
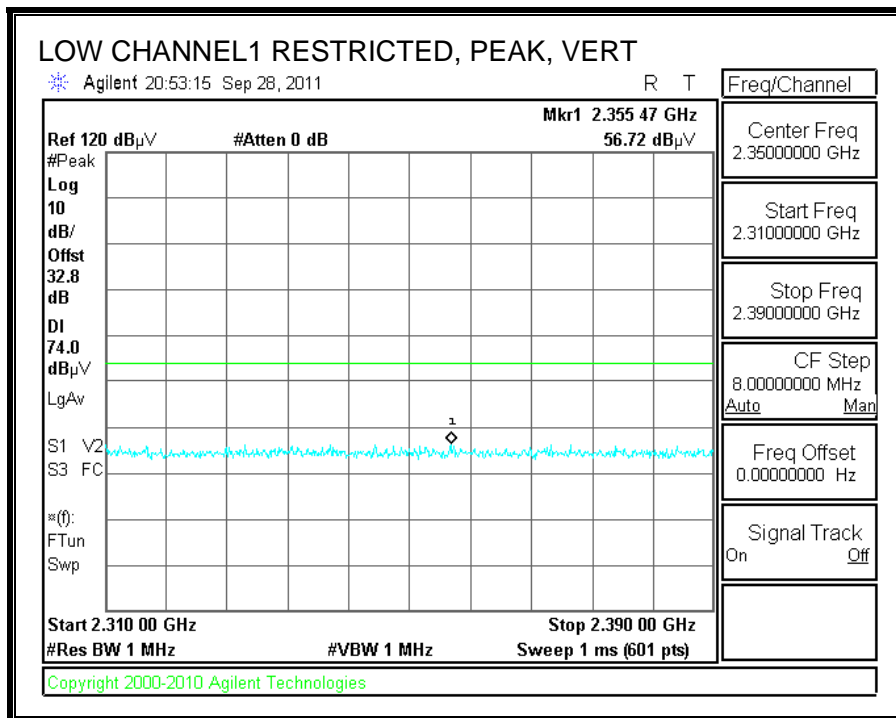
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

**Type C**

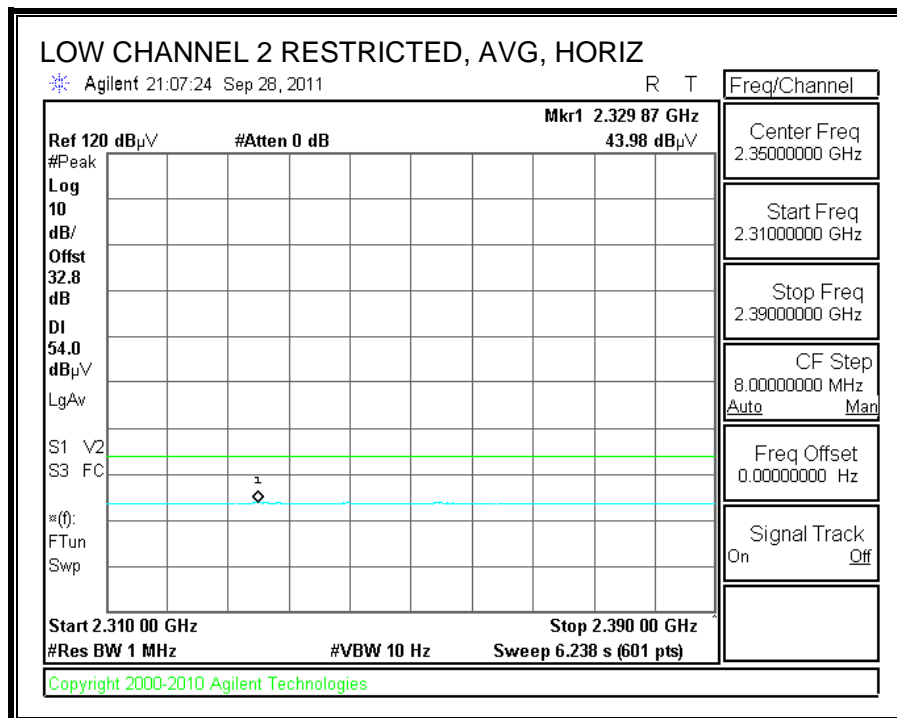
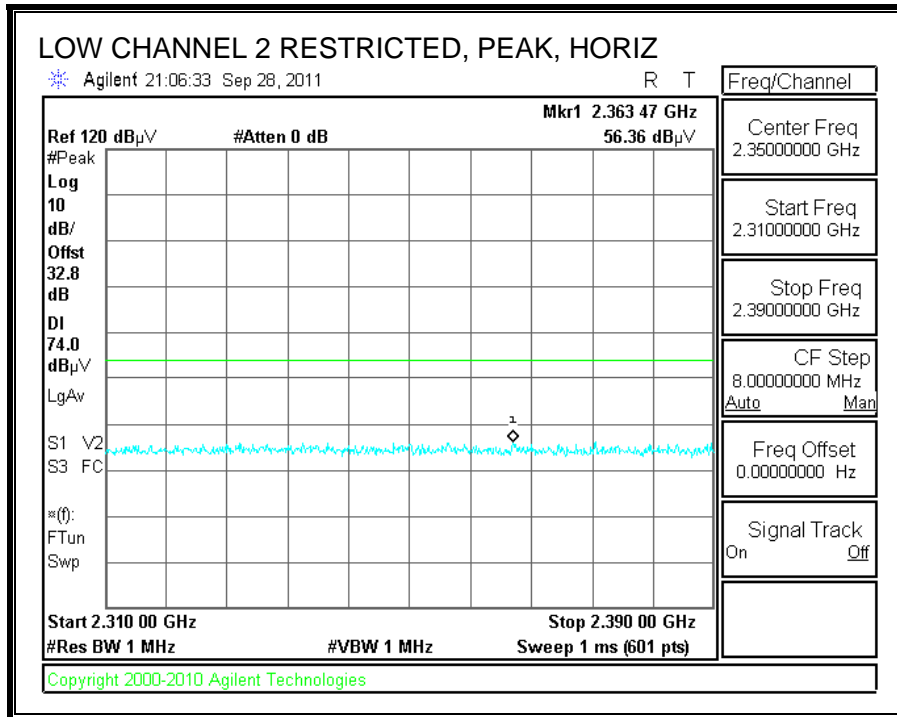
**RESTRICTED BANDEDGE (LOW CHANNEL1, HORIZONTAL)**



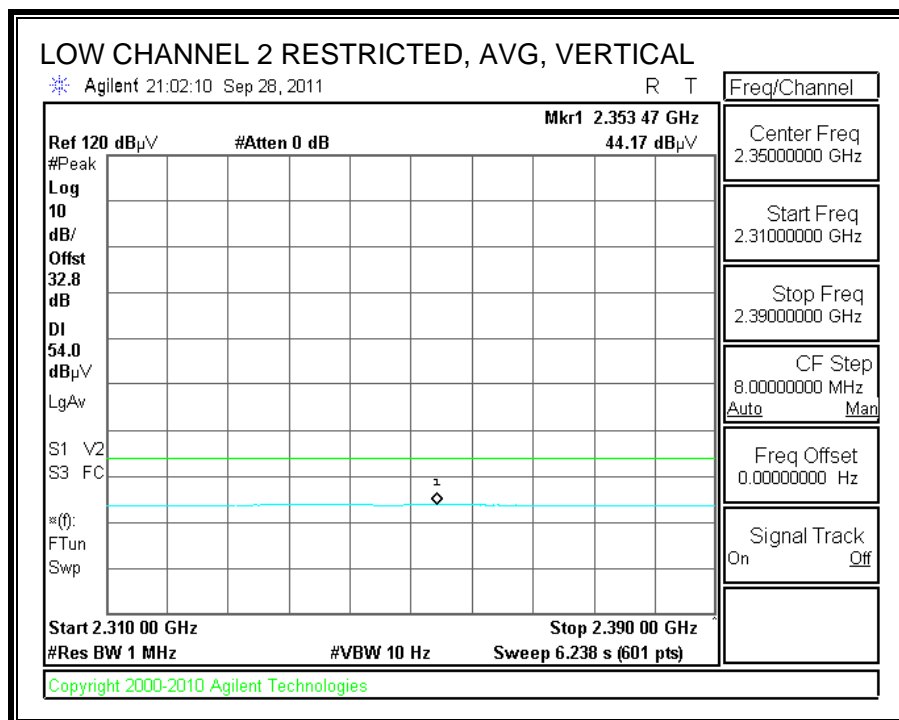
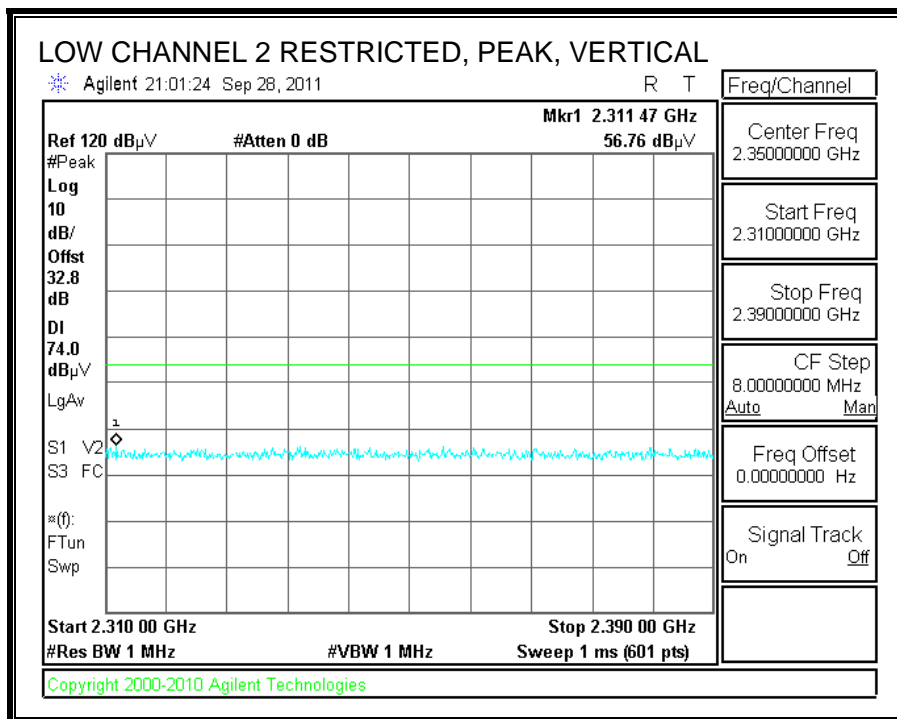
**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**



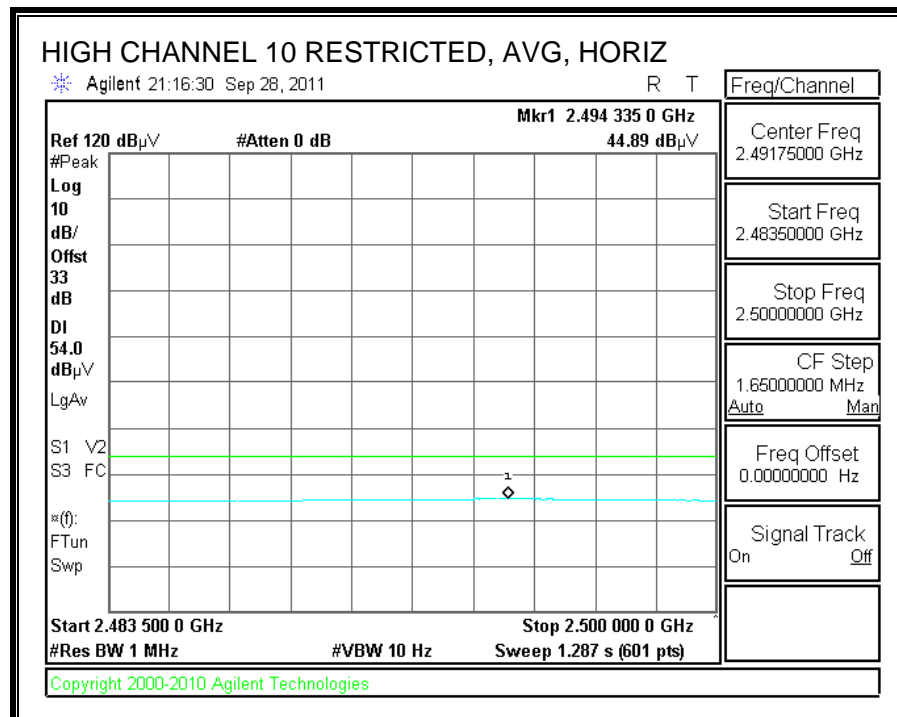
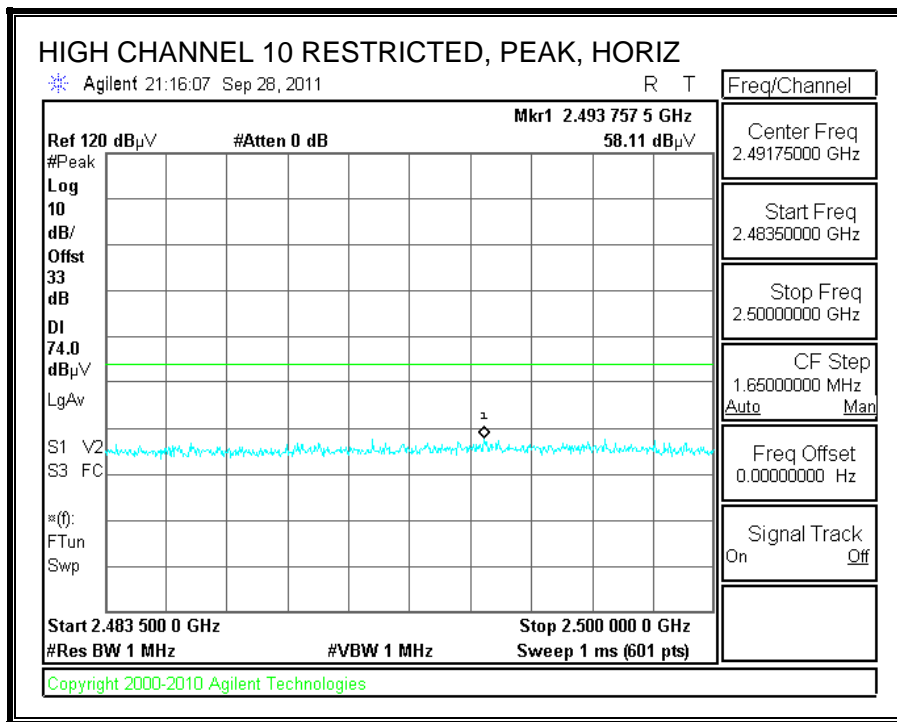
**RESTRICTED BANDEDGE (LOW CHANNEL2, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL2, VERTICAL)**

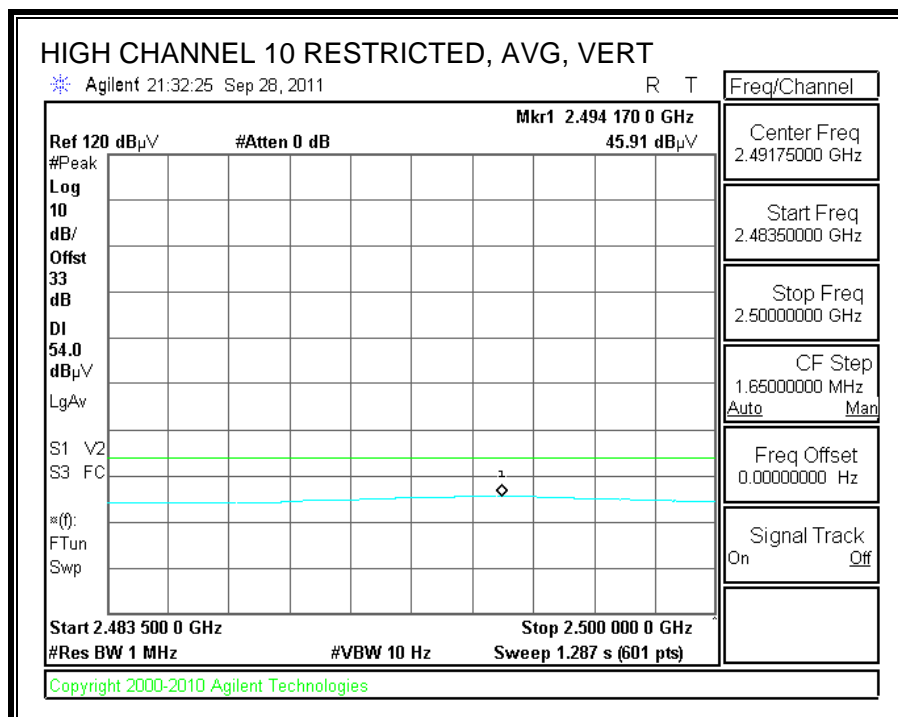
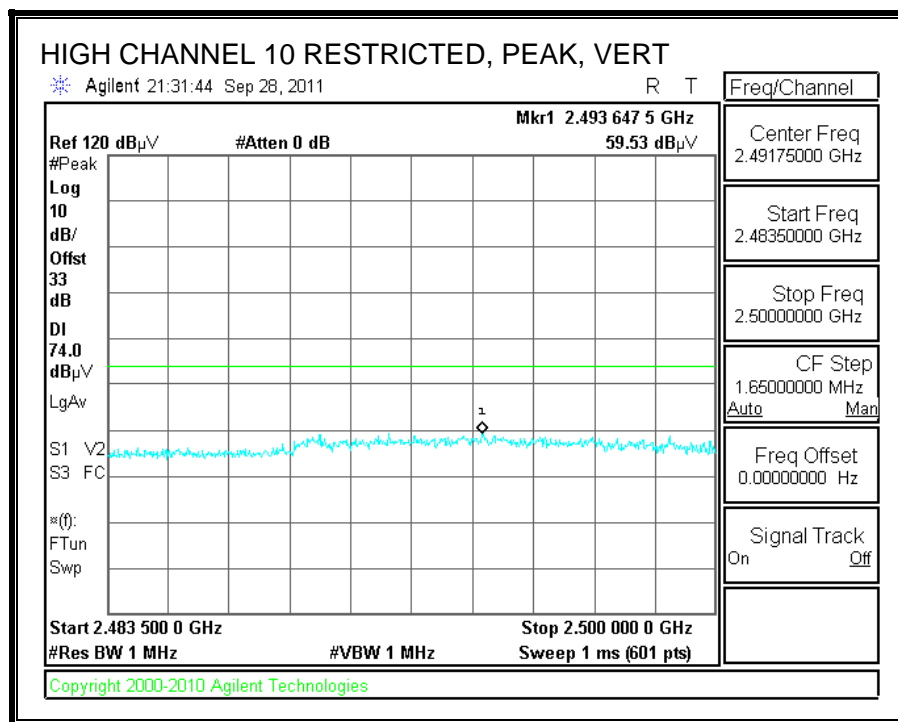


**RESTRICTED BANDEDGE (HIGH CHANNEL10, HORIZONTAL)**

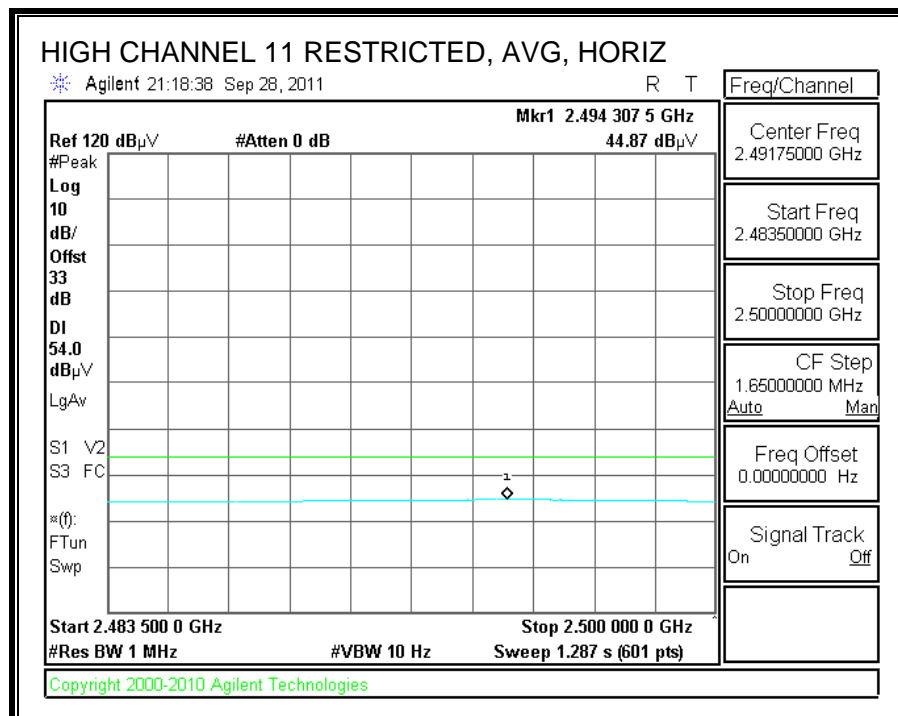
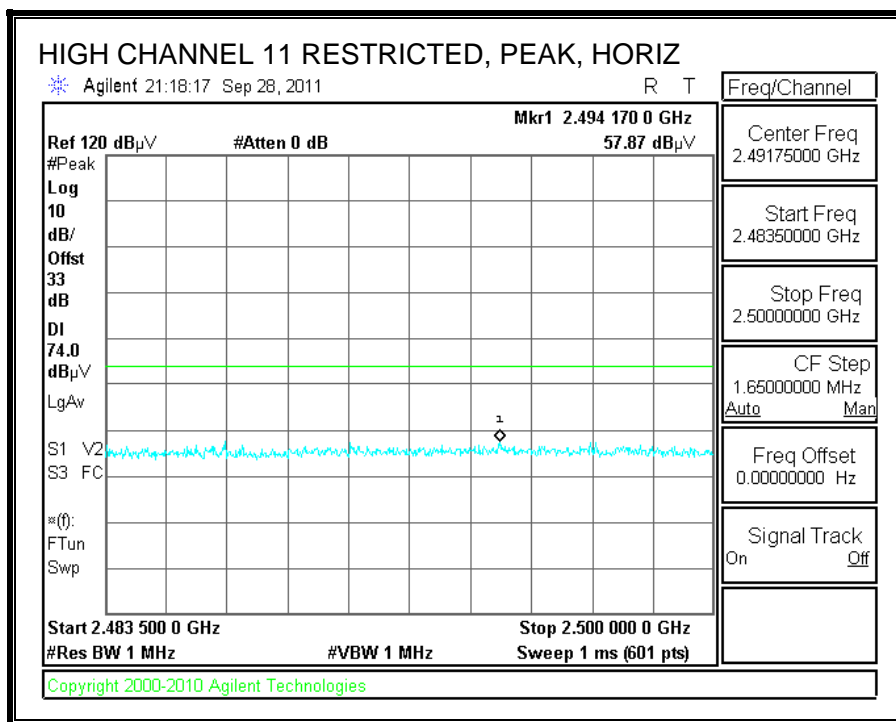




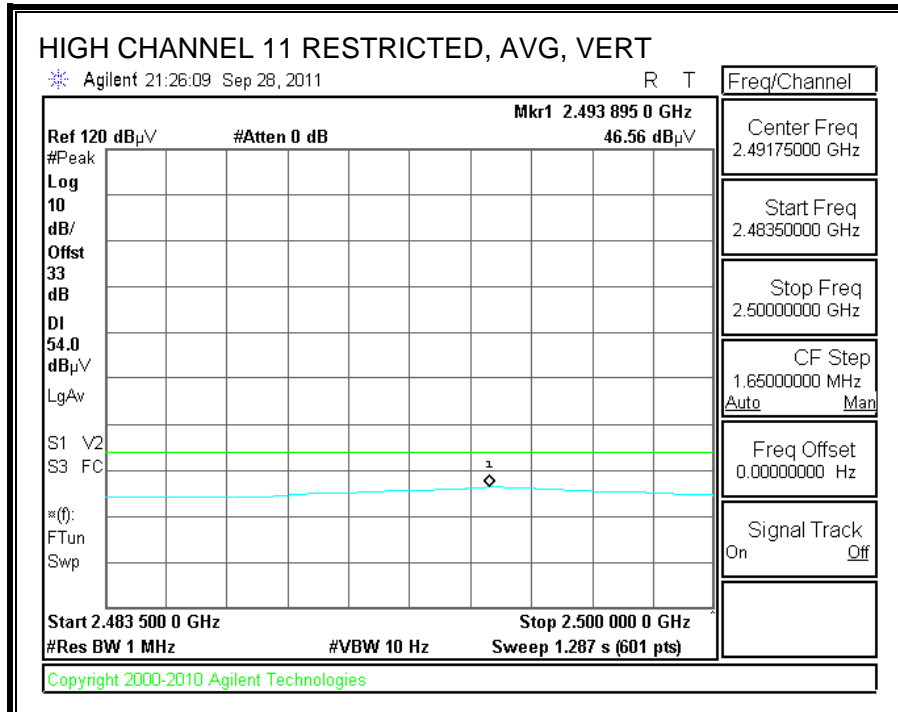
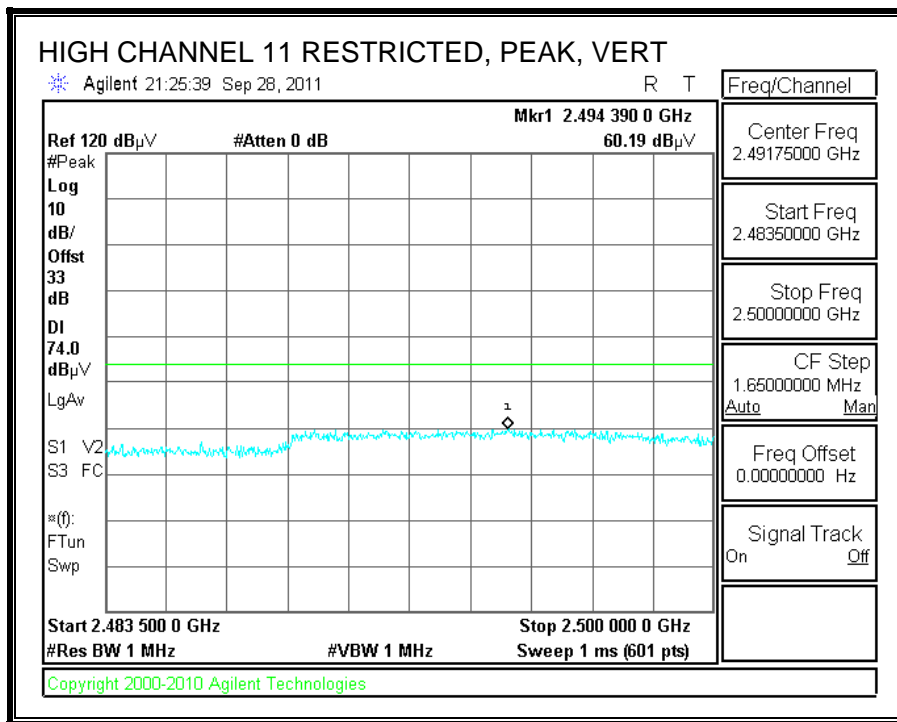
**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/17/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT Type C and remote Support Laptop  
 Mode: Transmit g mode

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T60; S/N: 2238 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

**Hi Frequency Cables**

<b>3' cable 22807700</b>	<b>12' cable 22807600</b>	<b>20' cable 22807500</b>	<b>HPF</b>	<b>Reject Filter</b>	<b>Peak Measurements</b> RBW=VBW=1MHz
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001	<b>Average Measurements</b> RBW=1MHz; VBW=10Hz

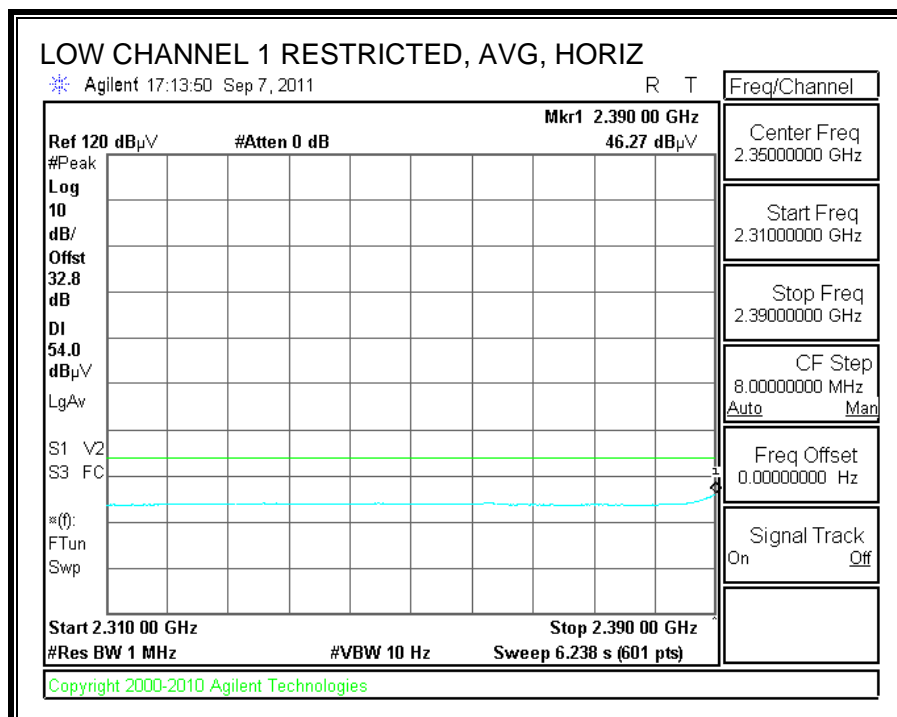
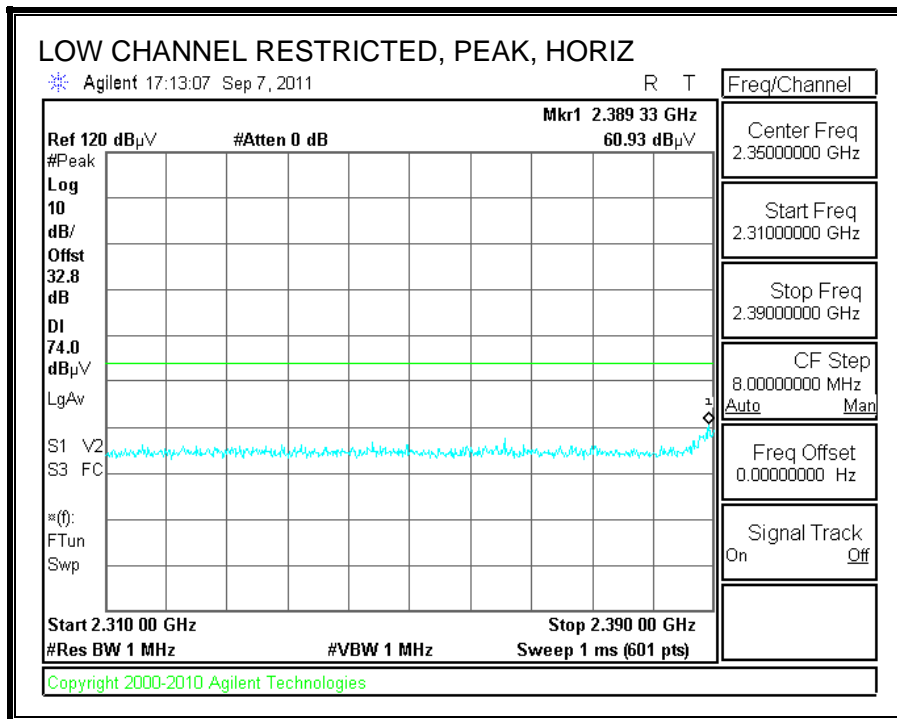
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
1.200	3.0	55.4	41.7	25.4	3.0	-37.5	0.0	0.0	46.3	32.6	74	54	-27.7	-21.4	V
4.824	3.0	40.9	28.1	33.9	6.8	-34.1	0.0	0.0	47.5	34.7	74	54	-26.5	-19.3	V
12.060	3.0	37.9	25.5	39.7	11.9	-32.3	0.0	0.0	57.2	44.9	74	54	-16.8	9.1	Noise floor
4.824	3.0	39.7	26.3	33.9	6.8	-34.1	0.0	0.0	46.3	32.9	74	54	-27.7	-21.1	H
12.060	3.0	37.9	25.5	39.7	11.9	-32.3	0.0	0.0	57.2	44.9	74	54	-16.8	9.1	Noise floor
1.200	3.0	58.6	43.5	25.4	3.0	-37.5	0.0	0.0	49.5	34.4	74	54	-24.5	-19.6	H
<b>Mid Ch</b>															
4.874	3.0	43.4	29.7	33.9	6.8	-34.0	0.0	0.0	50.1	36.4	74	54	-23.9	-17.6	V
7.311	3.0	42.6	28.6	36.6	9.1	-33.1	0.0	0.0	55.1	41.1	74	54	-18.9	-12.9	V
4.874	3.0	41.2	28.5	33.9	6.8	-34.0	0.0	0.0	47.9	35.2	74	54	-26.1	-18.8	H
7.311	3.0	40.1	25.5	36.6	9.1	-33.1	0.0	0.0	52.6	38.0	74	54	-21.4	-16.0	Noise floor
<b>High Ch</b>															
4.924	3.0	45.2	31.9	34.0	6.8	-34.0	0.0	0.0	52.0	38.6	74	54	-22.0	-15.4	V
7.386	3.0	44.3	32.2	36.6	9.1	-33.1	0.0	0.0	57.0	44.9	74	54	-17.0	9.1	V
4.924	3.0	42.7	29.3	34.0	6.8	-34.0	0.0	0.0	49.5	36.1	74	54	-24.5	-17.9	H
7.386	3.0	38.3	26.6	36.6	9.1	-33.1	0.0	0.0	51.0	39.3	74	54	-23.0	-14.7	H

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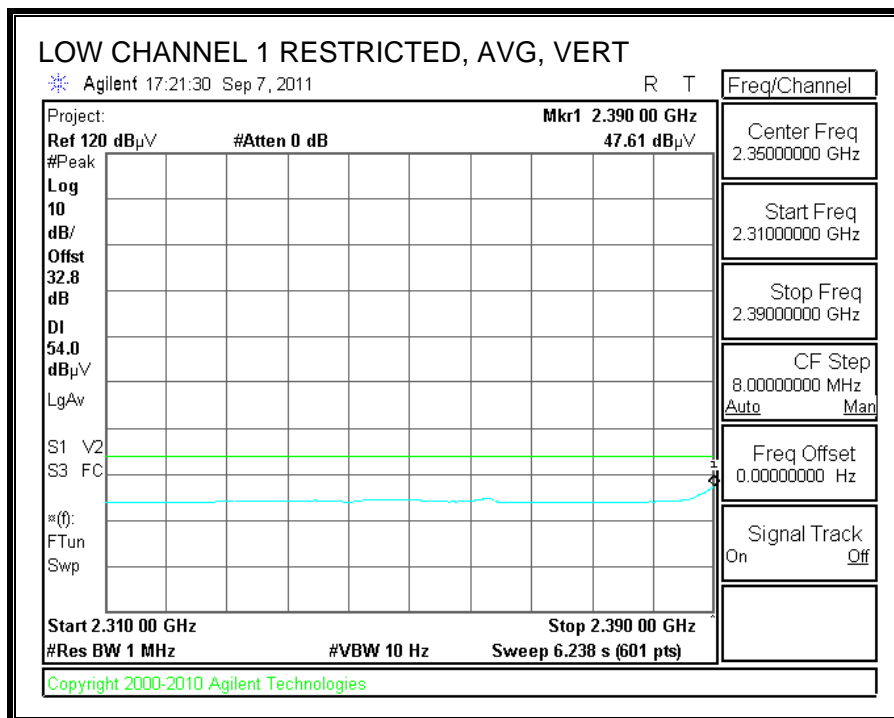
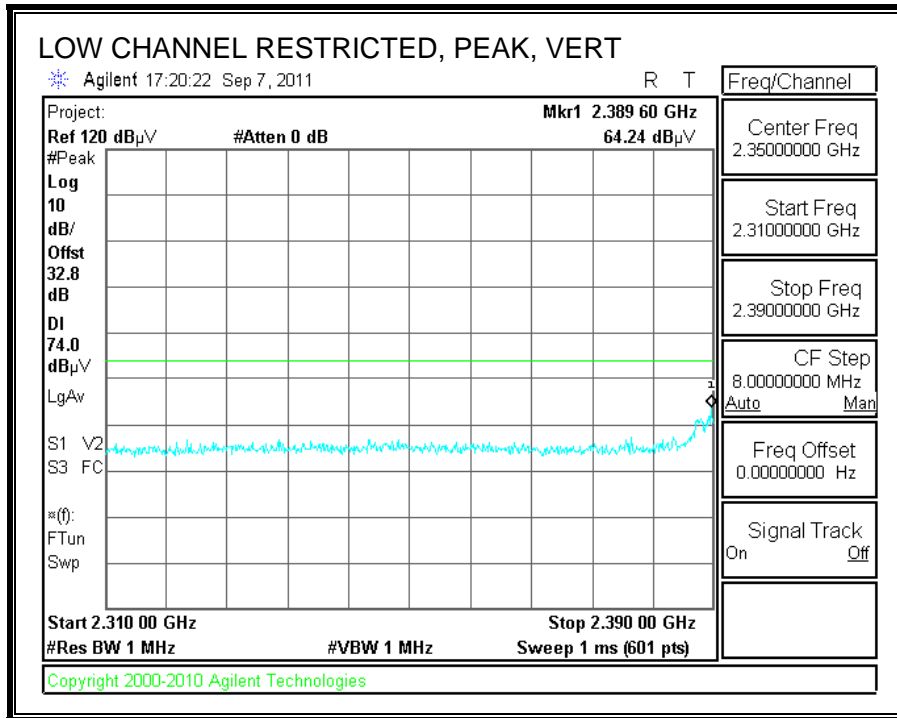
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

### 8.4. TX ABOVE 1 GHz FOR HT 20 MODE IN THE 2.4 GHz BAND Type A

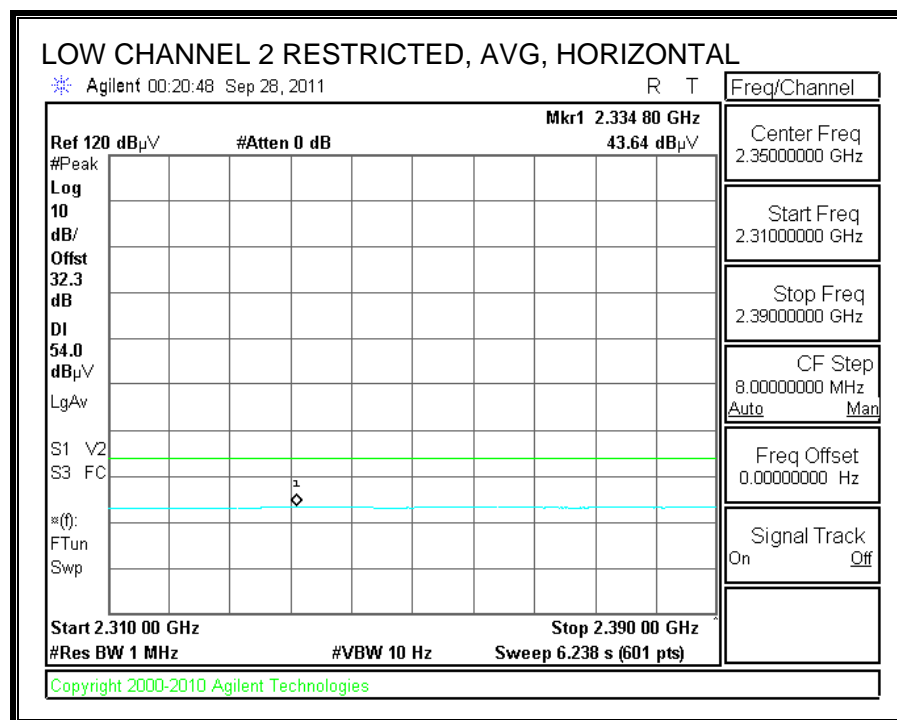
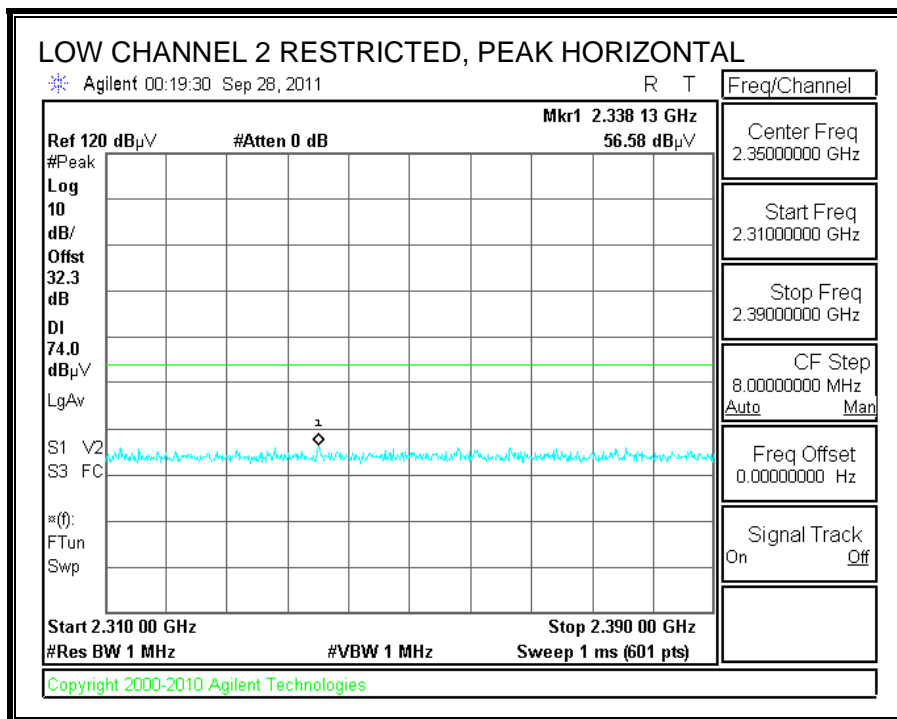
#### RESTRICTED BANDEDGE (LOW CHANNEL 1, HORIZONTAL)



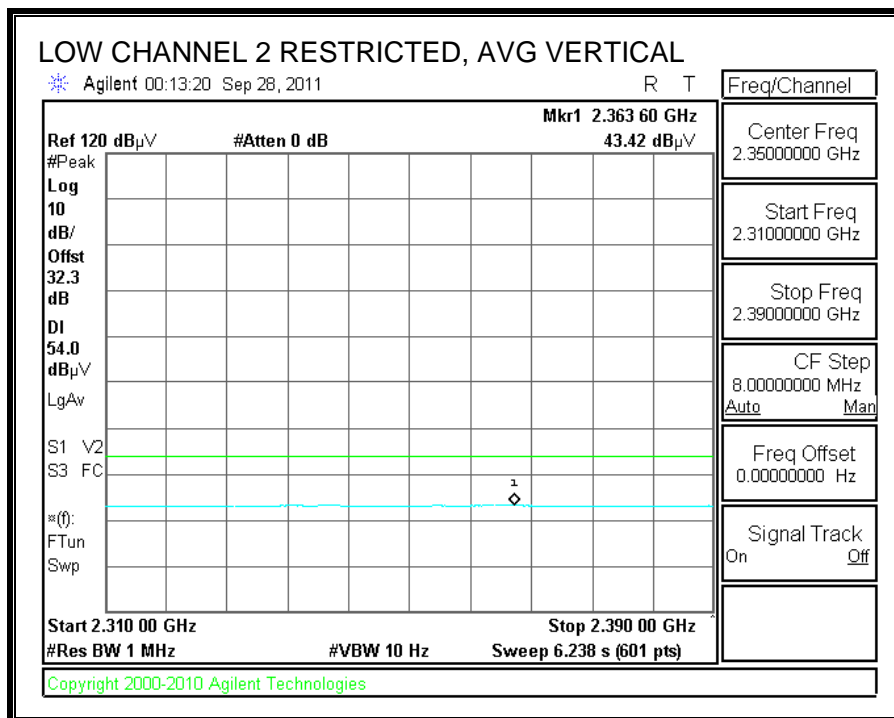
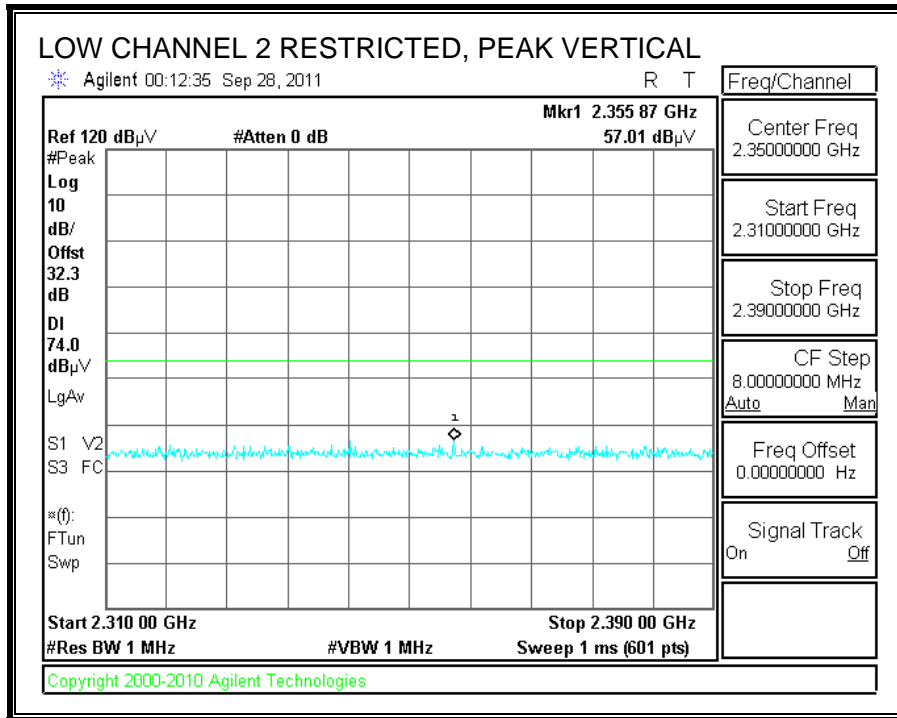
**RESTRICTED BANDEDGE (LOW CHANNEL1, VERTICAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL 2, HORIZONTAL)**

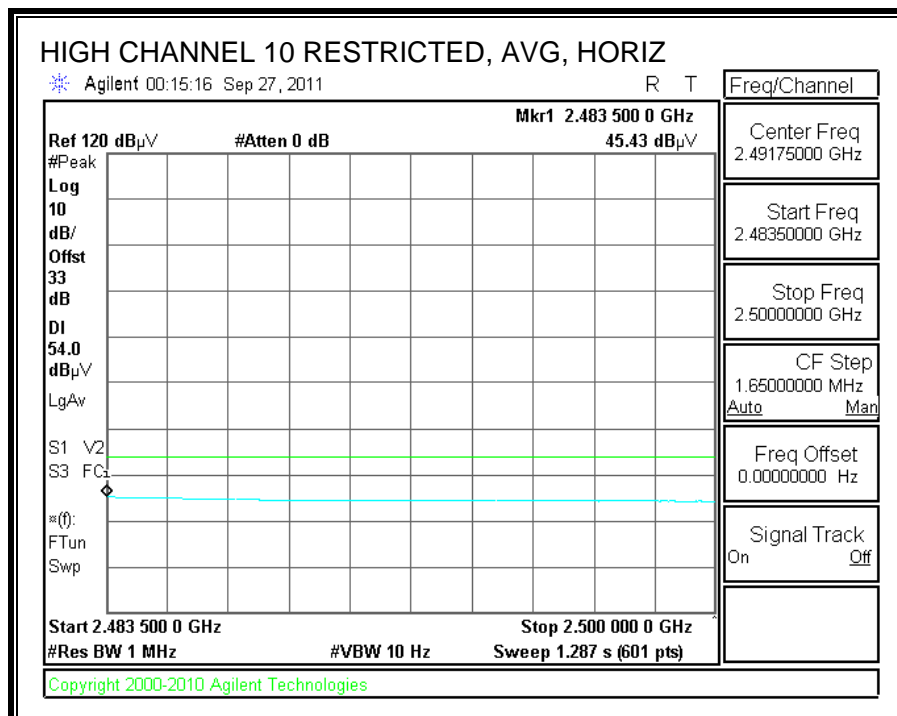
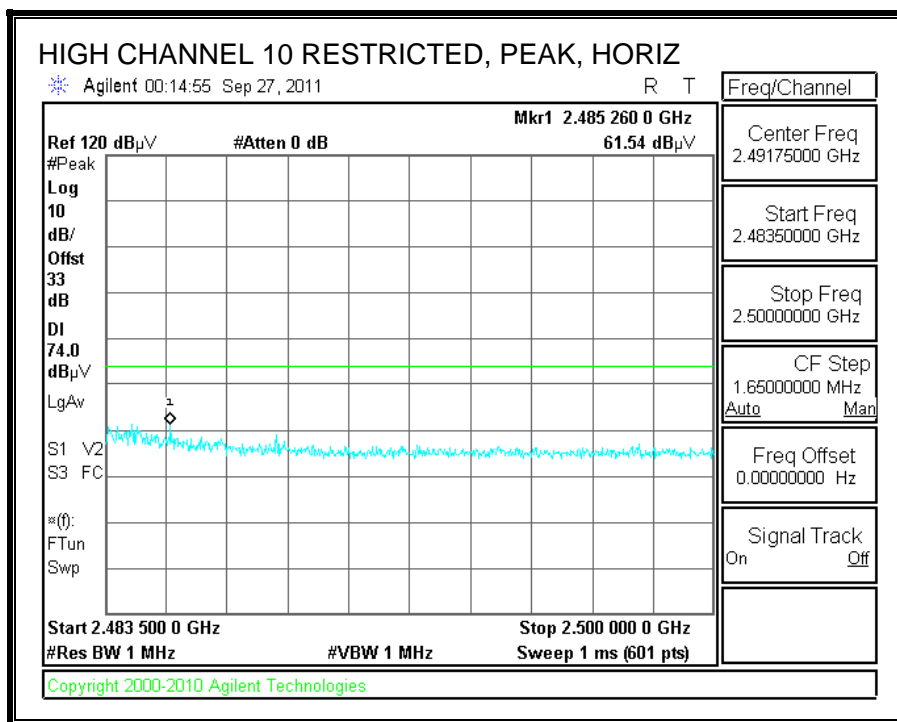


**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**

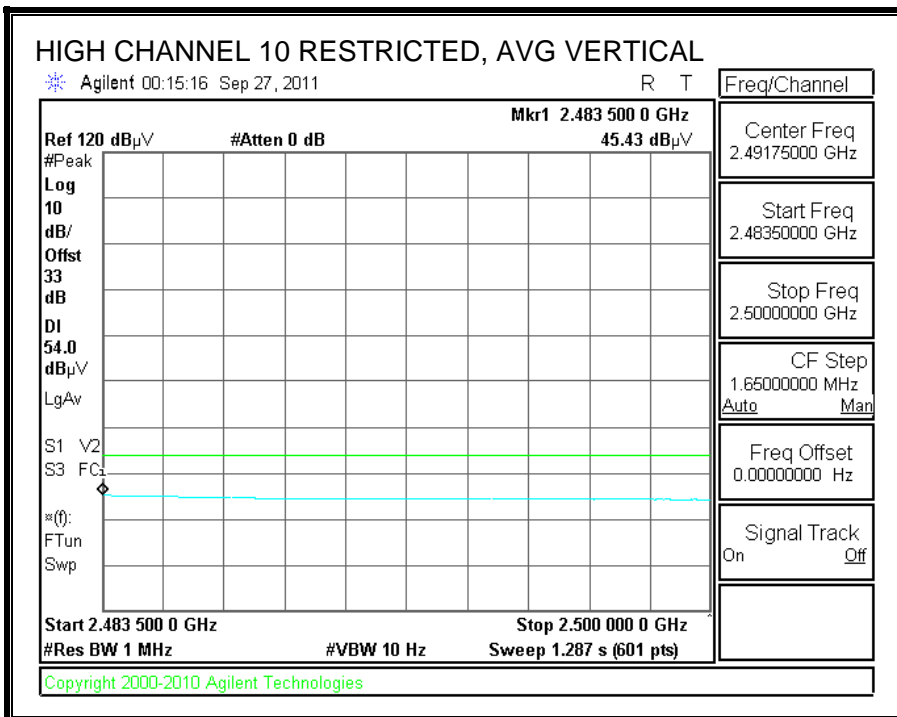
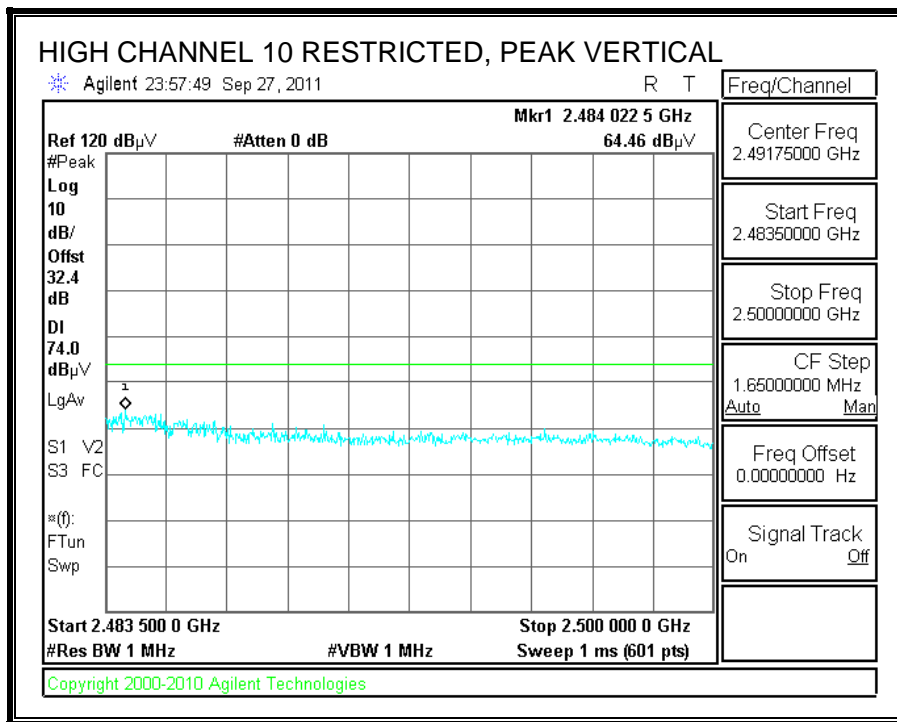




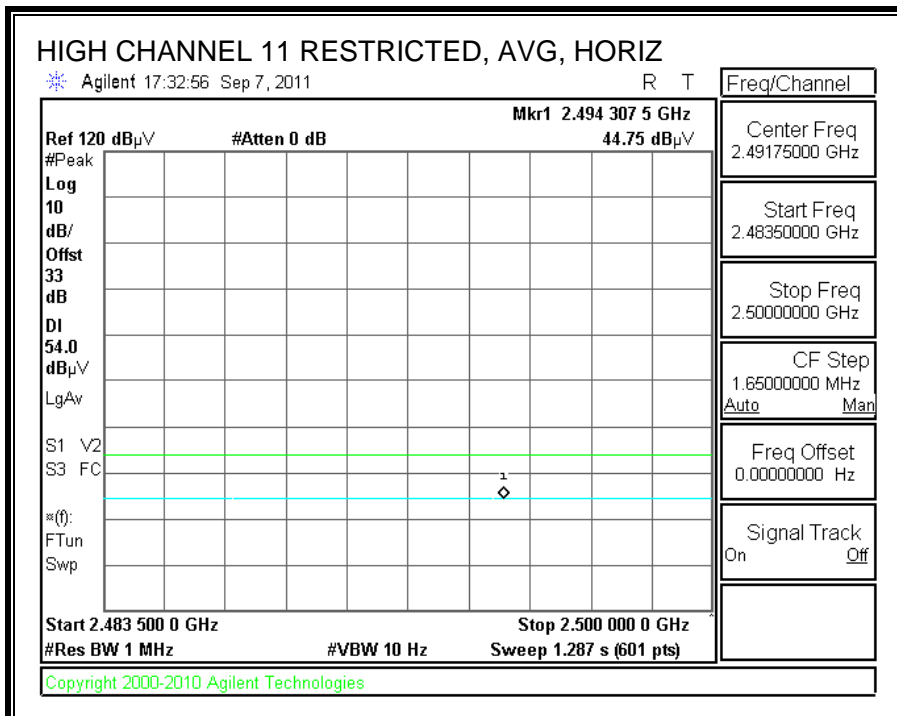
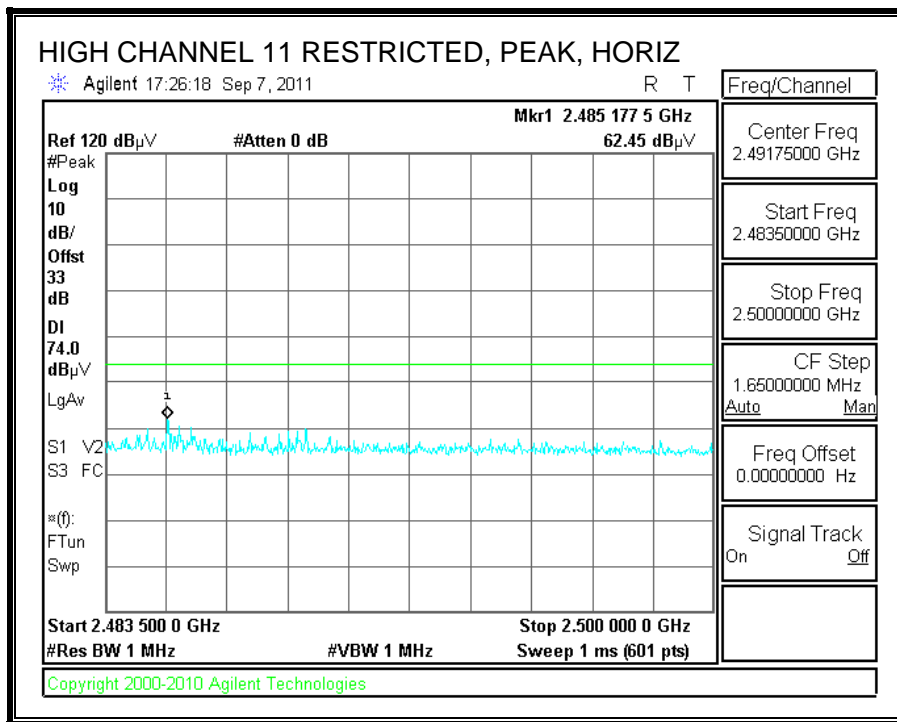
**RESTRICTED BANDEDGE (HIGH CHANNEL 10, HORIZONTAL)**



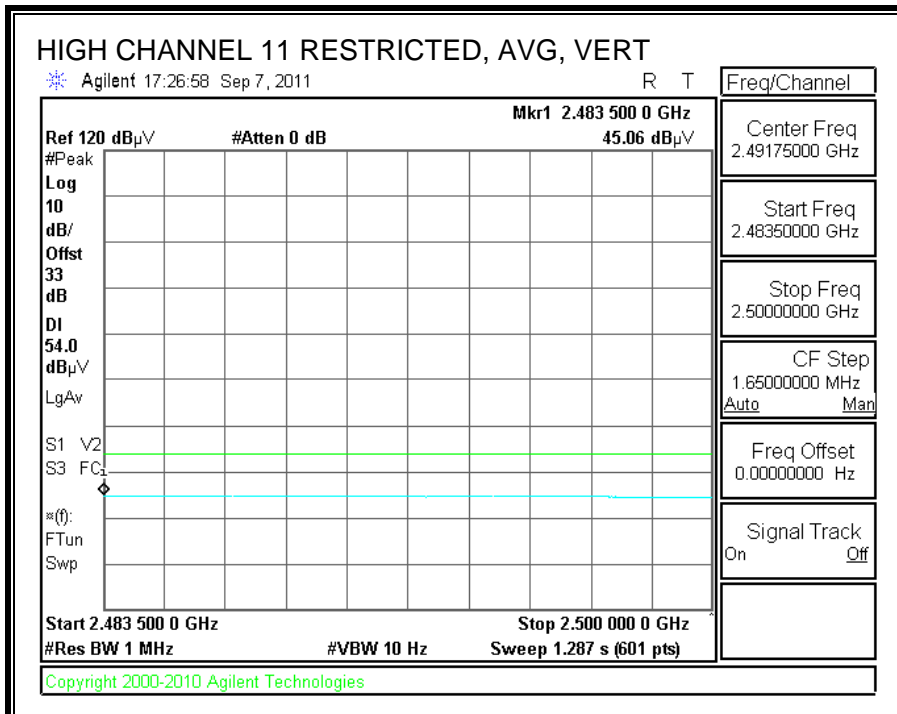
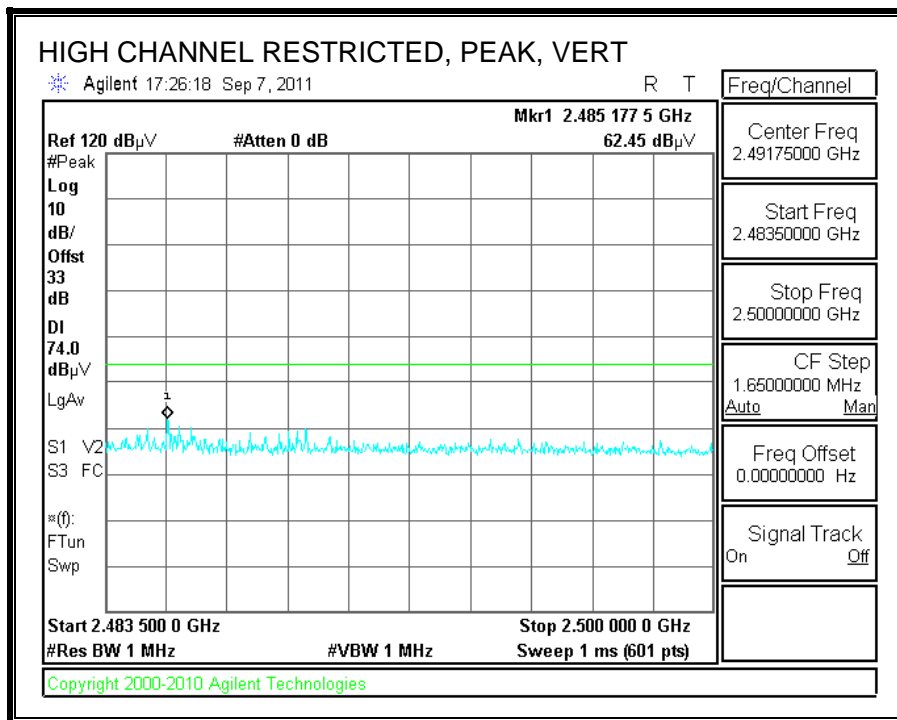
**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL 11, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**

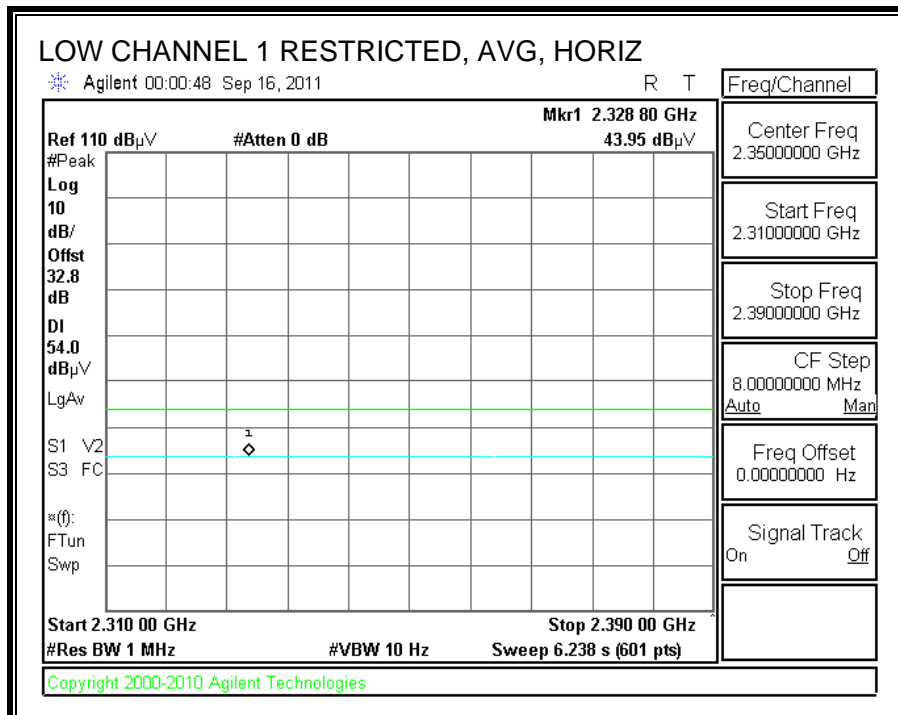
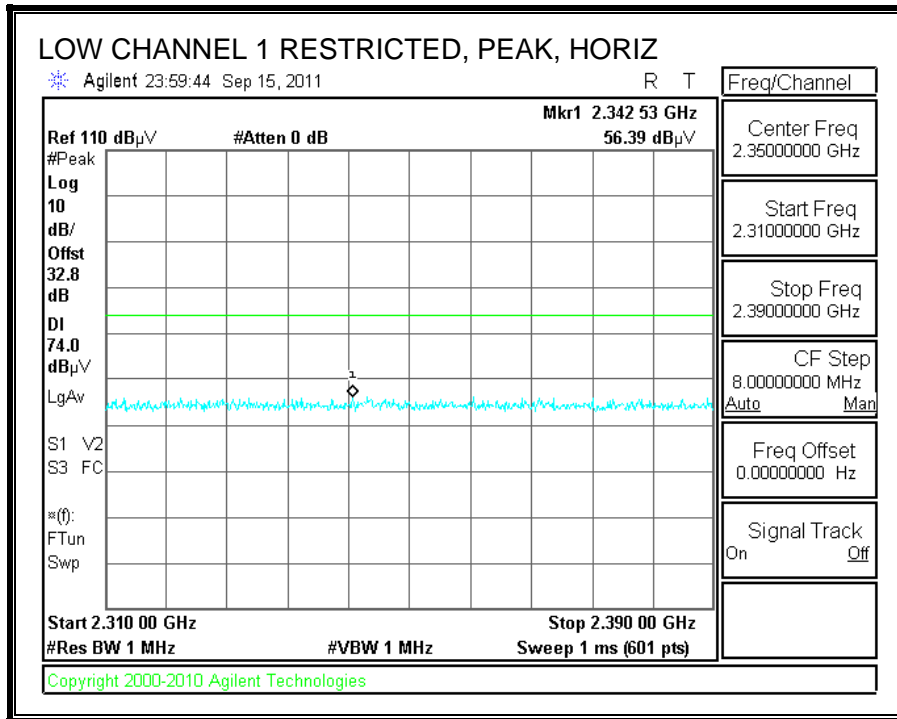


**HARMONICS AND SPURIOUS EMISSIONS**

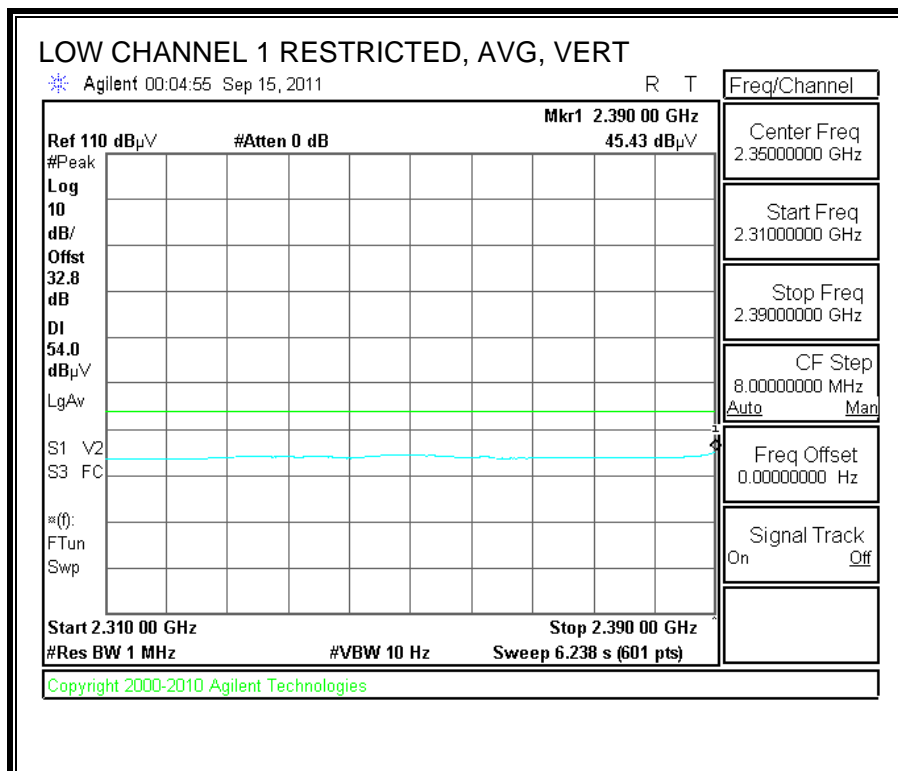
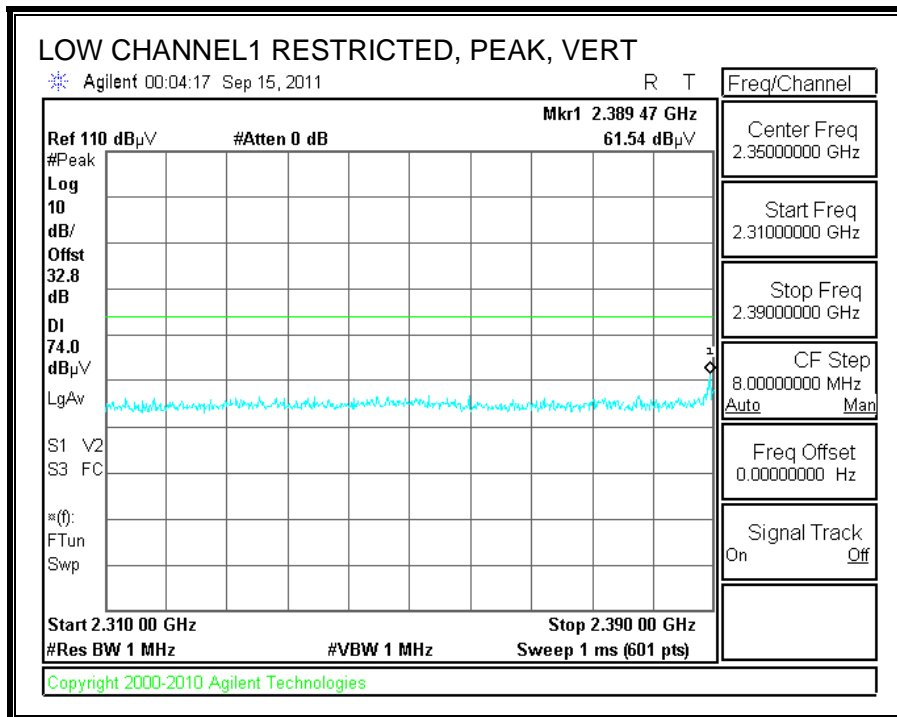
High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Mitsumi															
Project #:		11J14026															
Date:		9/7/2011															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT and Support Laptop															
Mode:		Transmit HT 20															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T34 HP 8449B						T39; ARA 18-26GHz; S/N:1013			FCC 15.205					
<b>Hi Frequency Cables</b>																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz		
3' cable 22807700			12' cable 22807600			20' cable 22807500						R_001			Average Measurements RBW=1MHz ; VBW=10Hz		
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
<b>Low Ch</b>																	
1.200	3.0	48.7	35.3	25.4	3.0	-37.5	0.0	0.0	39.6	26.2	74	54	-34.4	-27.8	Y		
4.824	3.0	41.3	27.3	33.9	6.8	-34.1	0.0	0.0	47.9	33.9	74	54	-26.1	-20.1	Y		
12.060	3.0	34.8	22.8	39.7	11.9	-32.3	0.0	0.0	54.2	42.2	74	54	-19.8	-11.8	Noise floor		
4.824	3.0	36.9	25.6	33.9	6.8	-34.1	0.0	0.0	43.5	32.2	74	54	-30.5	-21.8	H		
12.060	3.0	34.2	22.3	39.7	11.9	-32.3	0.0	0.0	53.6	41.7	74	54	-20.4	-12.3	Noise floor		
1.200	3.0	54.4	35.3	25.4	3.0	-37.5	0.0	0.0	45.3	26.2	74	54	-28.7	-27.8	H		
<b>Mid Ch</b>																	
4.874	3.0	43.3	26.6	33.9	6.8	-34.0	0.0	0.0	50.0	33.3	74	54	-24.0	-20.7	Y		
7.311	3.0	35.7	23.6	36.6	9.1	-33.1	0.0	0.0	48.2	36.1	74	54	-25.8	-17.9	Noise floor		
4.874	3.0	38.6	24.9	33.9	6.8	-34.0	0.0	0.0	45.3	31.6	74	54	-28.7	-22.4	H		
7.311	3.0	36.6	24.4	36.6	9.1	-33.1	0.0	0.0	49.1	36.9	74	54	-24.9	-17.1	Noise floor		
<b>High Ch</b>																	
4.924	3.0	39.5	27.4	34.0	6.8	-34.0	0.0	0.0	46.3	34.2	74	54	-27.7	-19.8	Y		
7.386	3.0	36.2	24.6	36.6	9.1	-33.1	0.0	0.0	48.9	37.2	74	54	-25.1	-16.8	Noise floor		
4.924	3.0	38.7	26.3	34.0	6.8	-34.0	0.0	0.0	45.5	33.1	74	54	-28.5	-20.9	H		
7.386	3.0	36.6	23.8	36.6	9.1	-33.1	0.0	0.0	49.2	36.4	74	54	-24.8	-17.6	Noise floor		
Rev. 07.08.11																	
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										

**Type B**

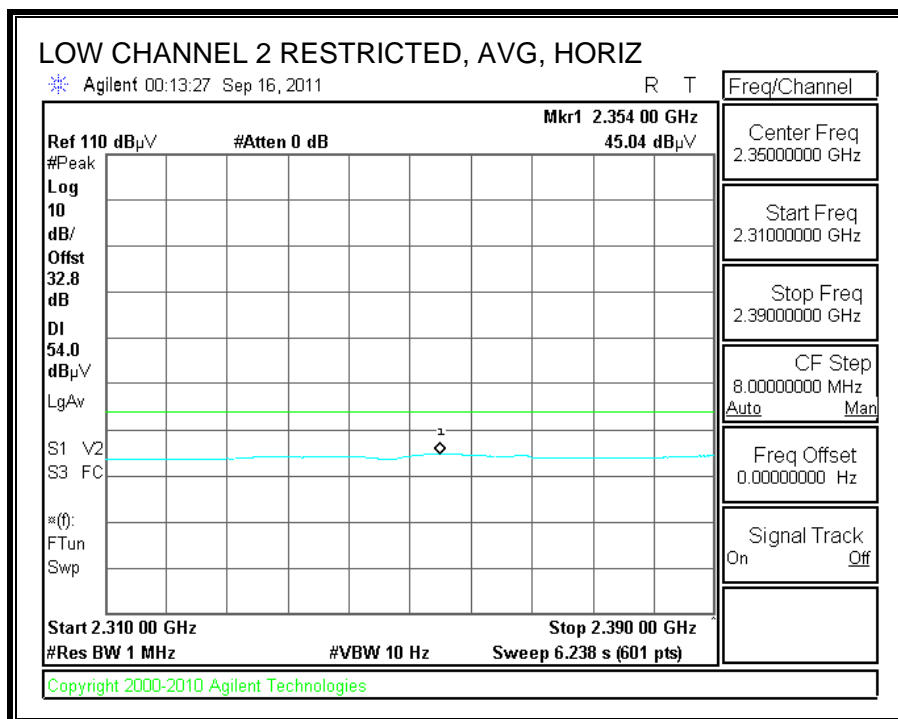
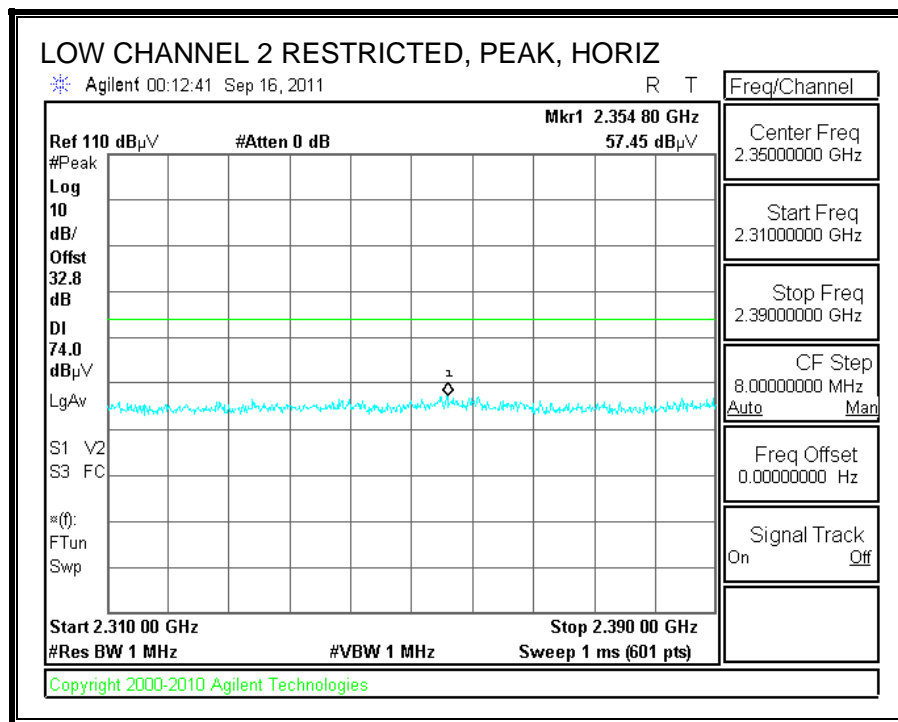
**RESTRICTED BANDEDGE (LOW CHANNEL1, HORIZONTAL)**



**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**

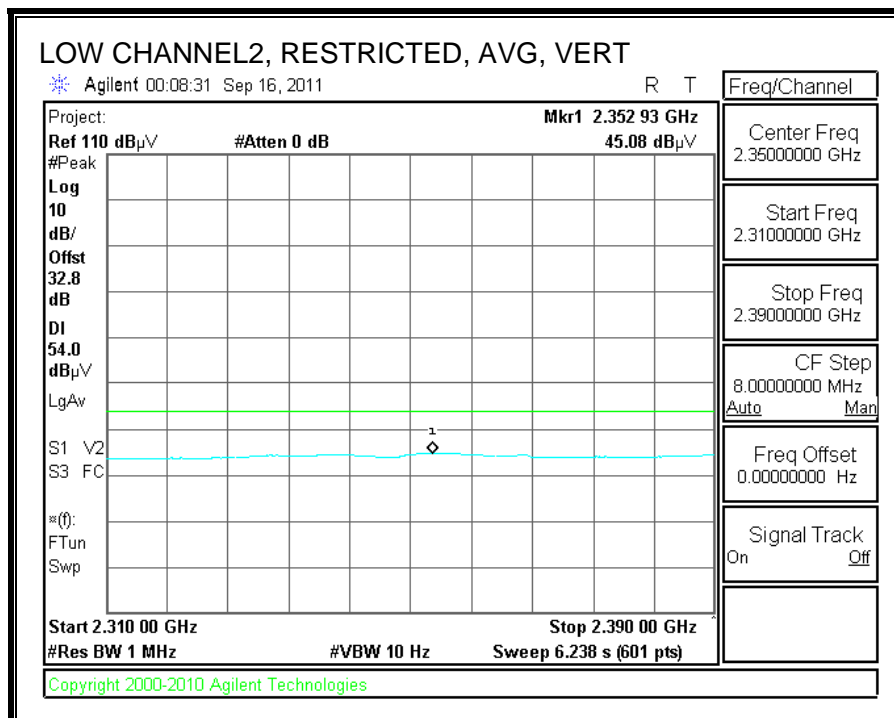
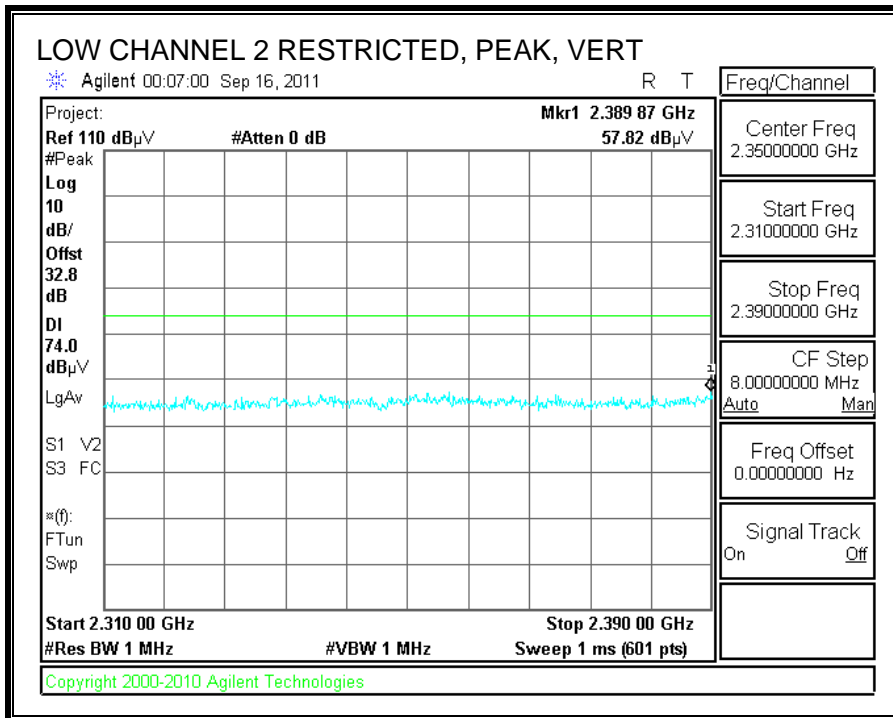


**RESTRICTED BANDEDGE (LOW CHANNEL 2, HORIZONTAL)**

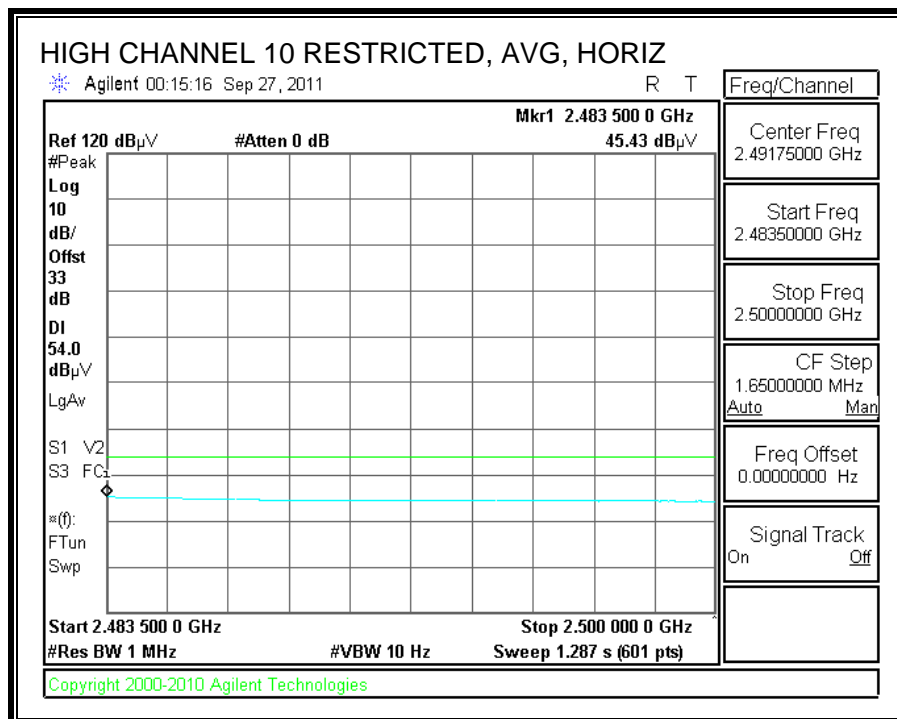
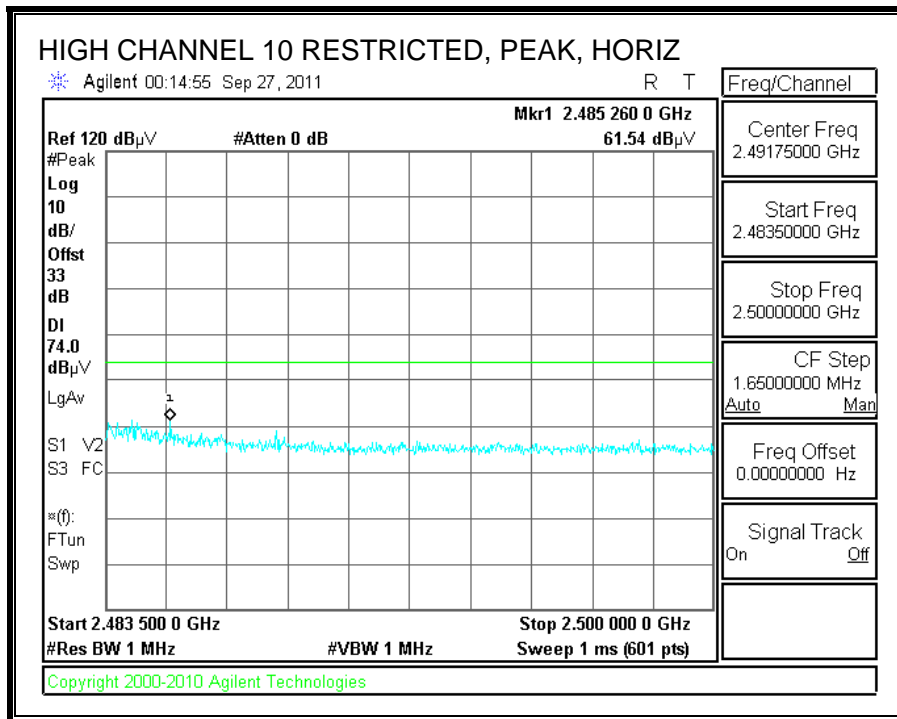




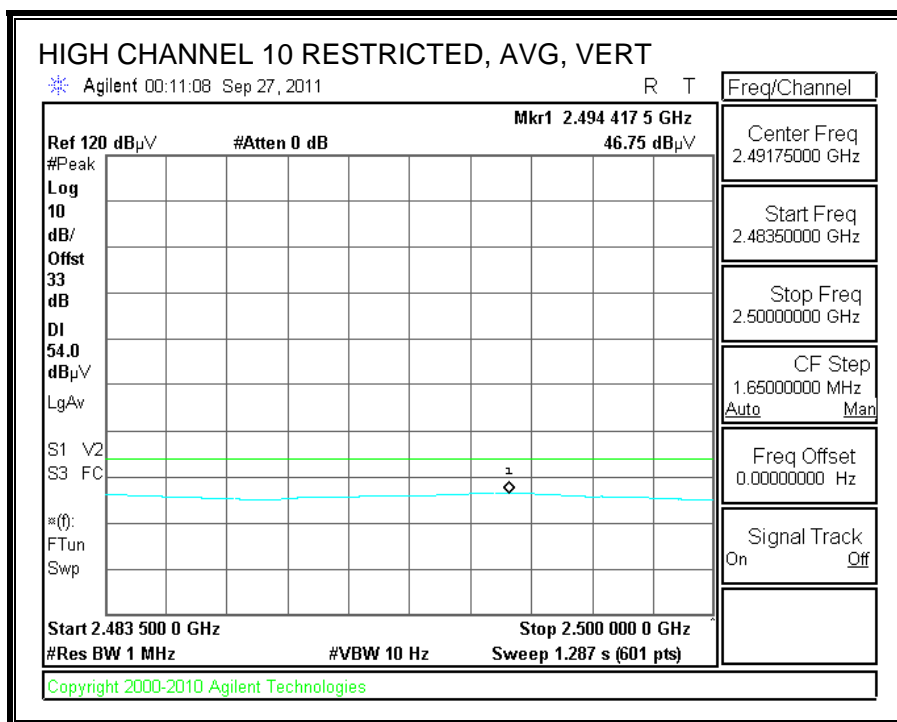
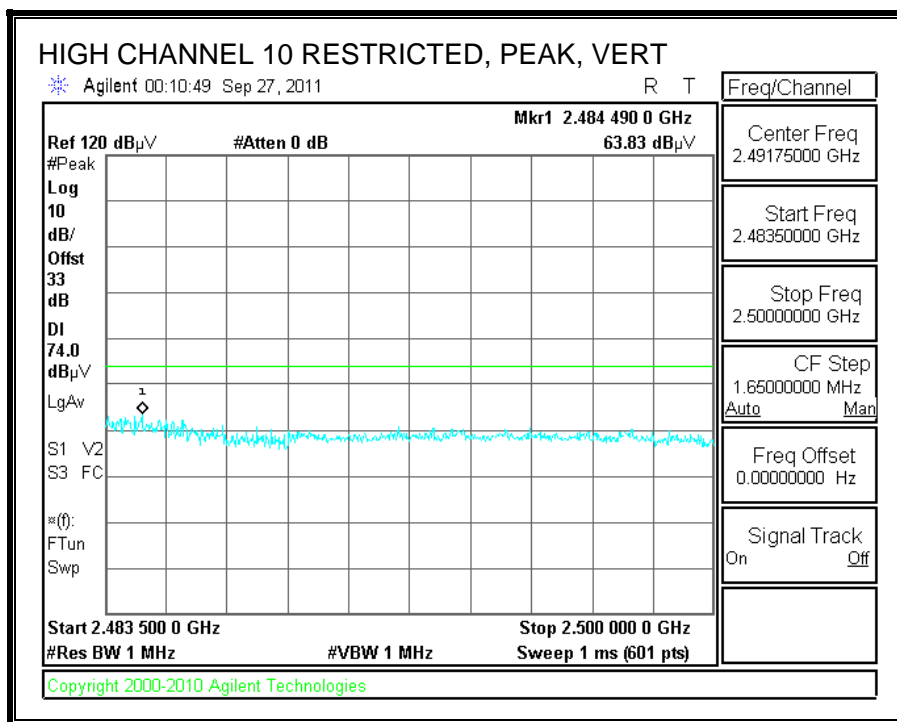
**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**



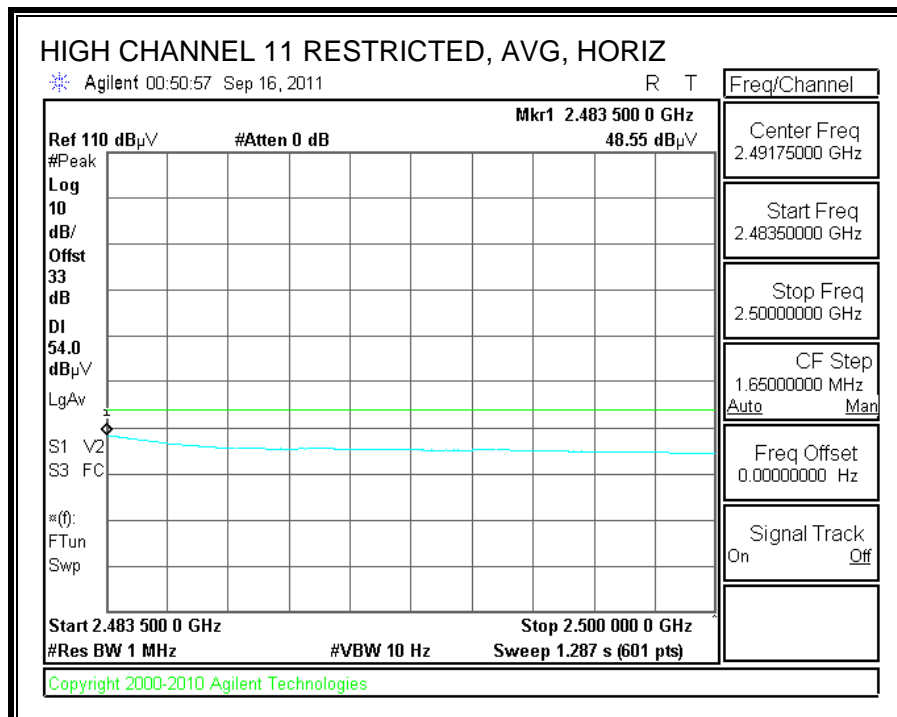
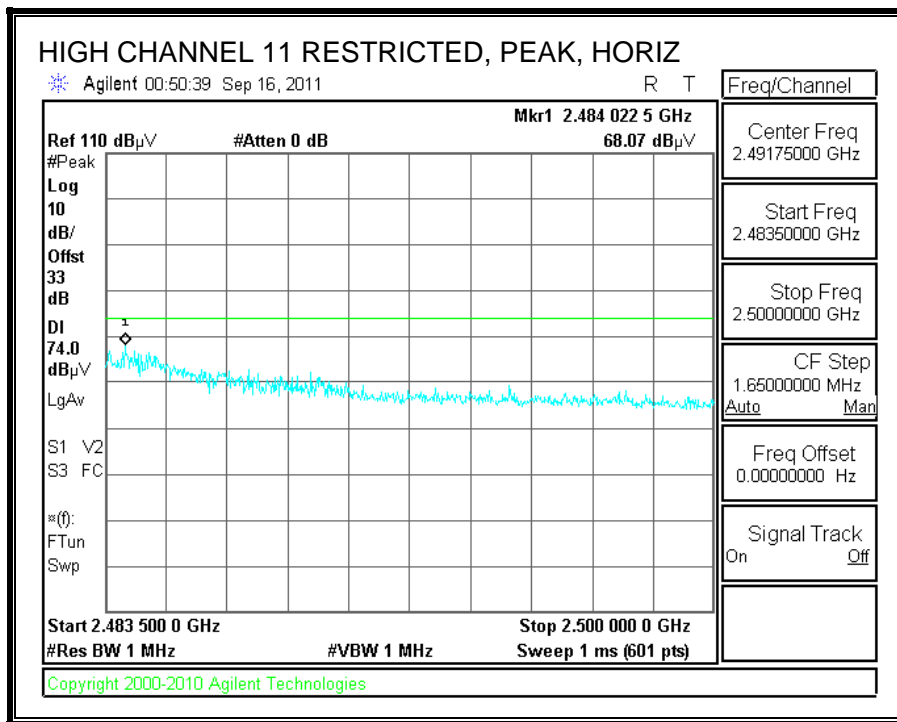
**RESTRICTED BANDEDGE (HIGH CHANNEL10, HORIZONTAL)**



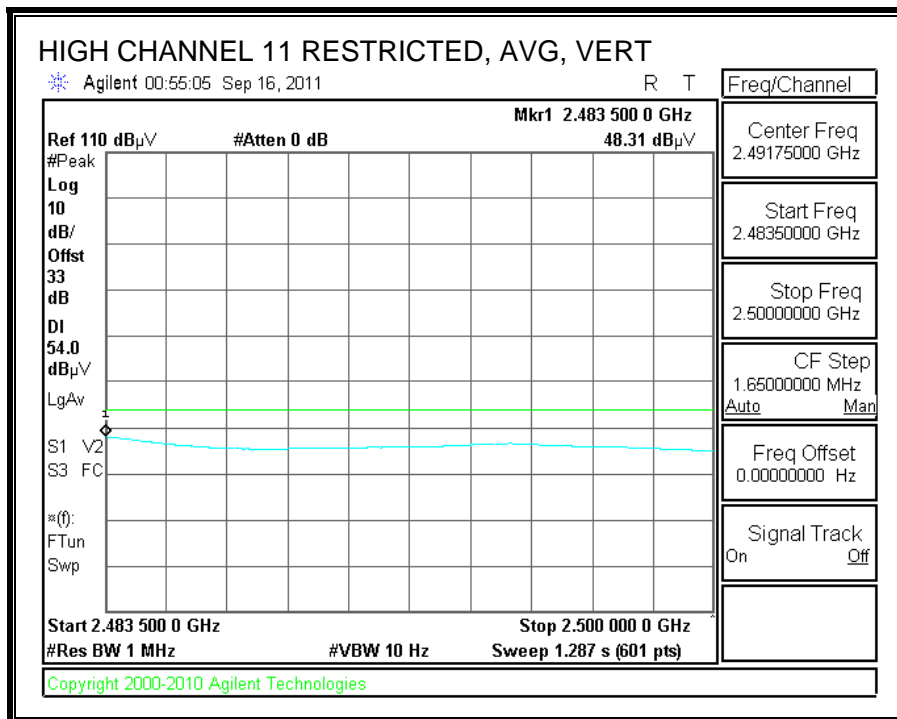
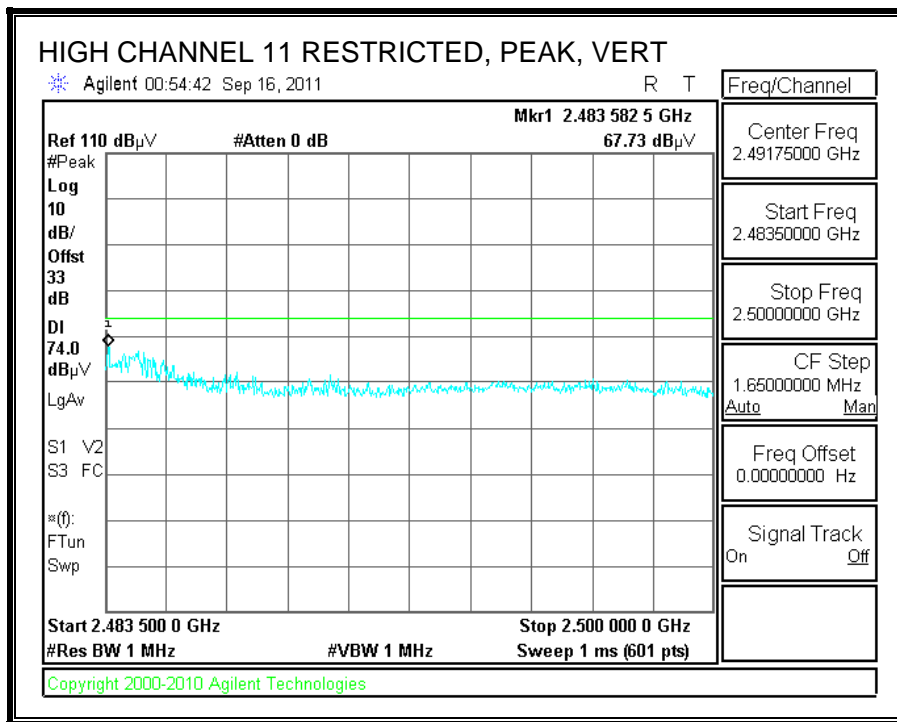
**RESTRICTED BANDEDGE (HIGH CHANNEL10, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL11, VERTICAL)**

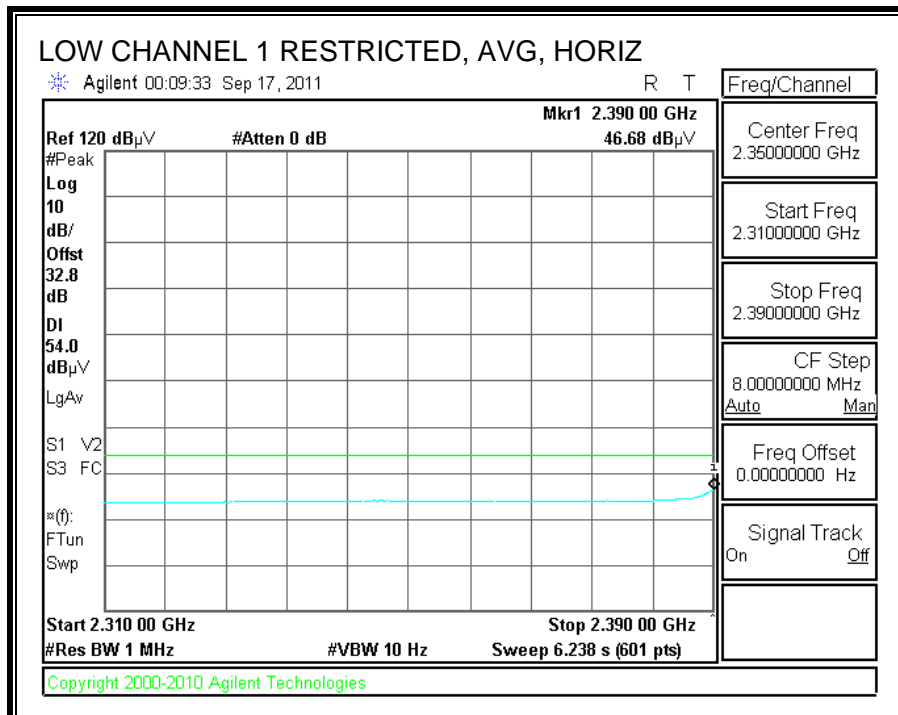
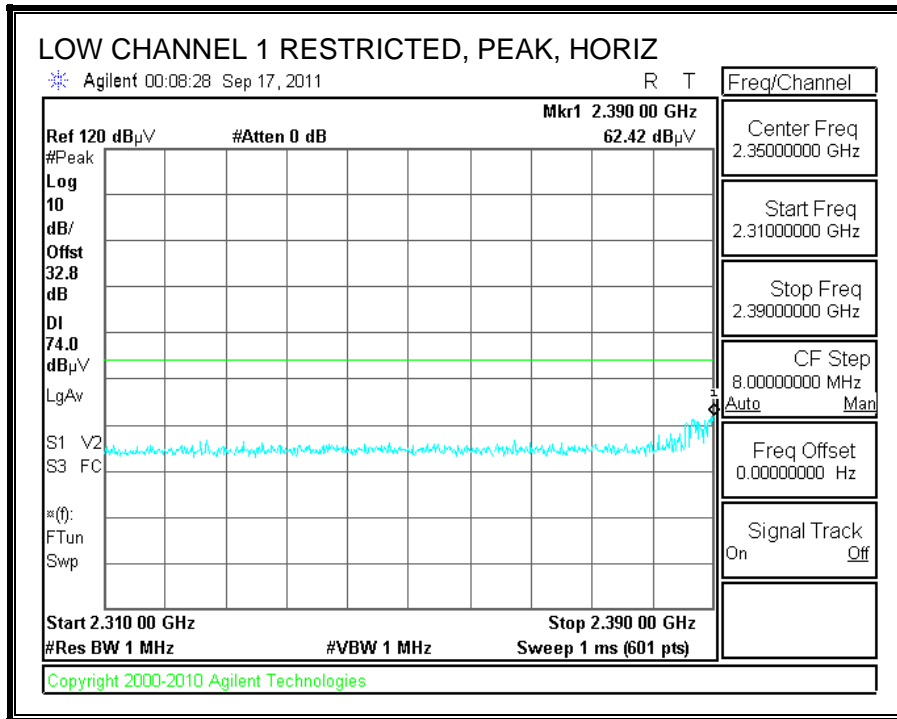


**HARMONICS AND SPURIOUS EMISSIONS**

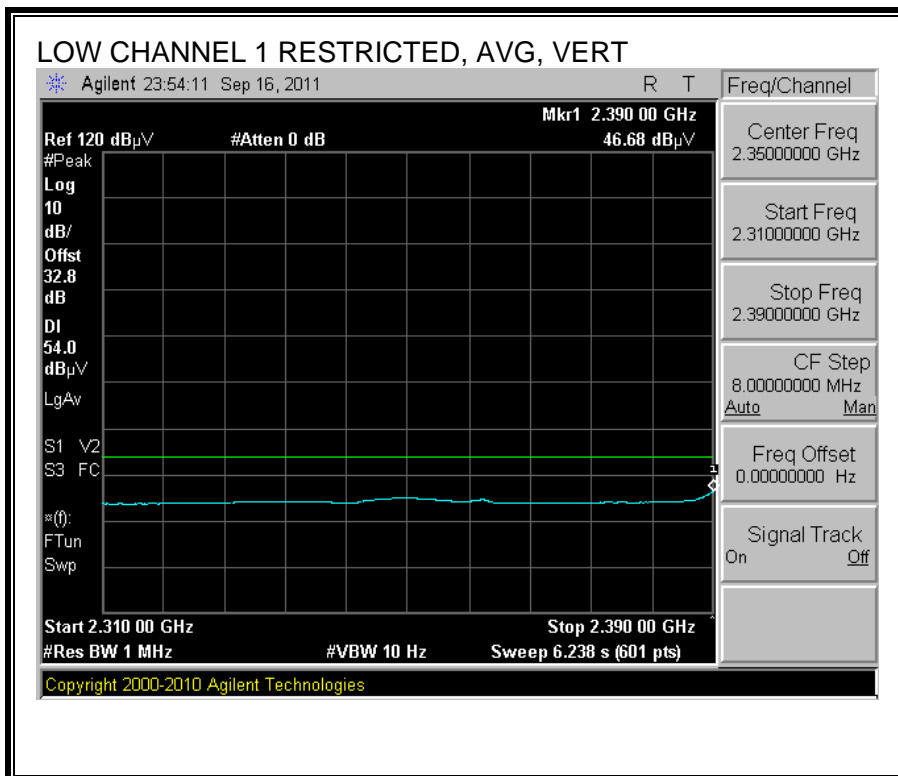
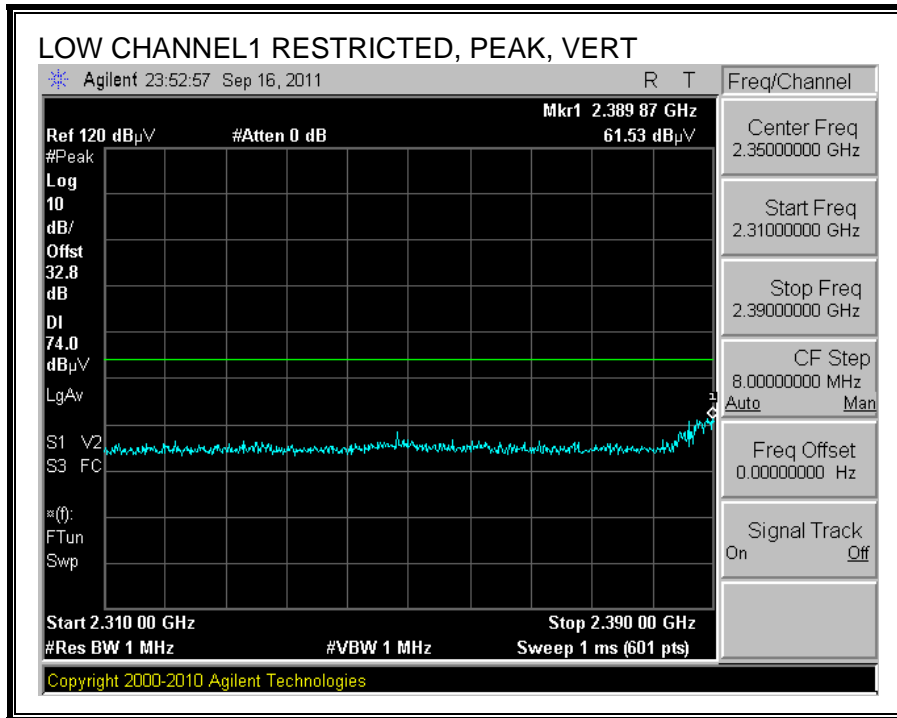
High Frequency Measurement																	
Compliance Certification Services, Fremont 3m Chamber																	
Company:		Mitsumi															
Project #:		11J14026															
Date:		9/17/2011															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT and Support Laptop															
Mode:		Transmit HT 20															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T60; S/N: 2238 @3m			T34 HP 8449B						T39; ARA 18-26GHz; S/N:1013			FCC 15.205					
<b>Hi Frequency Cables</b>																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz		
3' cable 22807700			12' cable 22807600			20' cable 22807500						R_001			Average Measurements RBW=1MHz ; VBW=10Hz		
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)		
<b>Low Ch</b>																	
1.200	3.0	56.1	40.8	25.4	3.0	-37.5	0.0	0.0	47.0	31.7	74	54	-27.0	-22.3	Y		
4.824	3.0	43.3	30.2	33.9	6.8	-34.1	0.0	0.0	49.9	36.8	74	54	-24.1	-17.2	V		
12.060	3.0	35.3	25.4	39.7	11.9	-32.3	0.0	0.0	54.6	44.7	74	54	-19.4	-9.3	Noise floor		
4.824	3.0	38.3	28.2	33.9	6.8	-34.1	0.0	0.0	44.9	34.8	74	54	-29.1	-19.2	H		
12.060	3.0	36.2	25.1	39.7	11.9	-32.3	0.0	0.0	55.6	44.5	74	54	-18.4	-9.5	Noise floor		
1.200	3.0	55.8	42.1	25.4	3.0	-37.5	0.0	0.0	46.7	33.0	74	54	-27.3	-21.0	H		
<b>Mid Ch</b>																	
4.874	3.0	45.2	28.3	33.9	6.8	-34.0	0.0	0.0	51.9	35.0	74	54	-22.1	-19.0	Y		
7.311	3.0	39.3	25.3	36.6	9.1	-33.1	0.0	0.0	51.8	37.9	74	54	-22.2	-16.1	Noise floor		
4.874	3.0	40.2	26.4	33.9	6.8	-34.0	0.0	0.0	46.9	33.1	74	54	-27.1	-20.9	H		
7.311	3.0	38.6	26.5	36.6	9.1	-33.1	0.0	0.0	51.2	39.1	74	54	-22.8	-14.9	Noise floor		
<b>High Ch</b>																	
4.924	3.0	45.0	31.2	34.0	6.8	-34.0	0.0	0.0	51.8	37.9	74	54	-22.2	-16.1	Y		
7.386	3.0	39.2	27.2	36.6	9.1	-33.1	0.0	0.0	51.9	39.9	74	54	-22.1	-14.1	Noise floor		
4.924	3.0	42.4	29.4	34.0	6.8	-34.0	0.0	0.0	49.2	36.1	74	54	-24.8	-17.9	H		
7.386	3.0	38.3	25.6	36.6	9.1	-33.1	0.0	0.0	50.9	38.2	74	54	-23.1	-15.8	Noise floor		
Rev. 07.08.11																	
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										

**Type C**

**RESTRICTED BANDEDGE (LOW CHANNEL1, HORIZONTAL)**

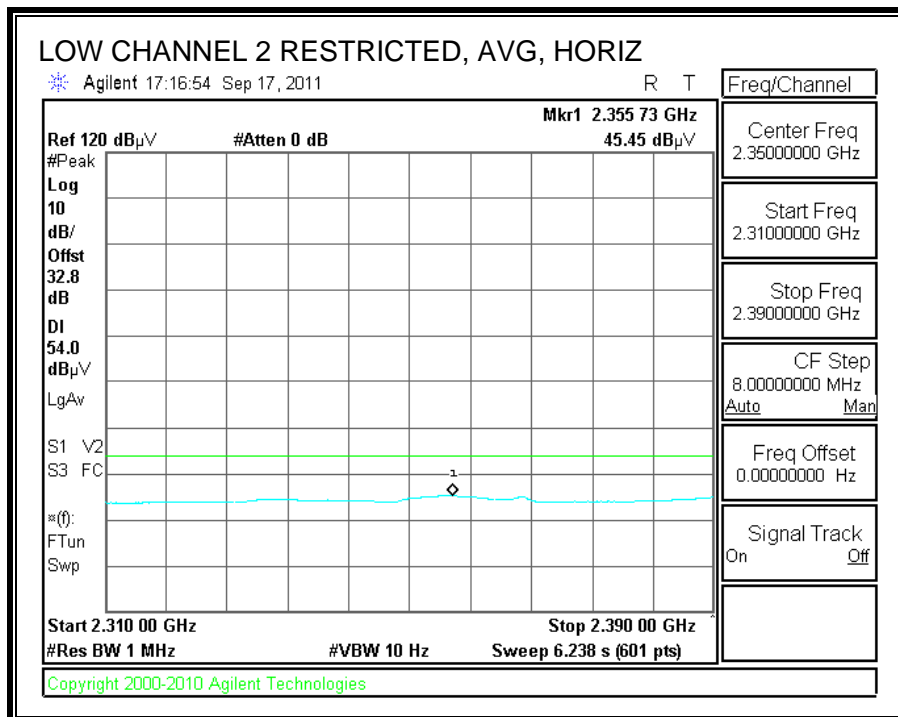
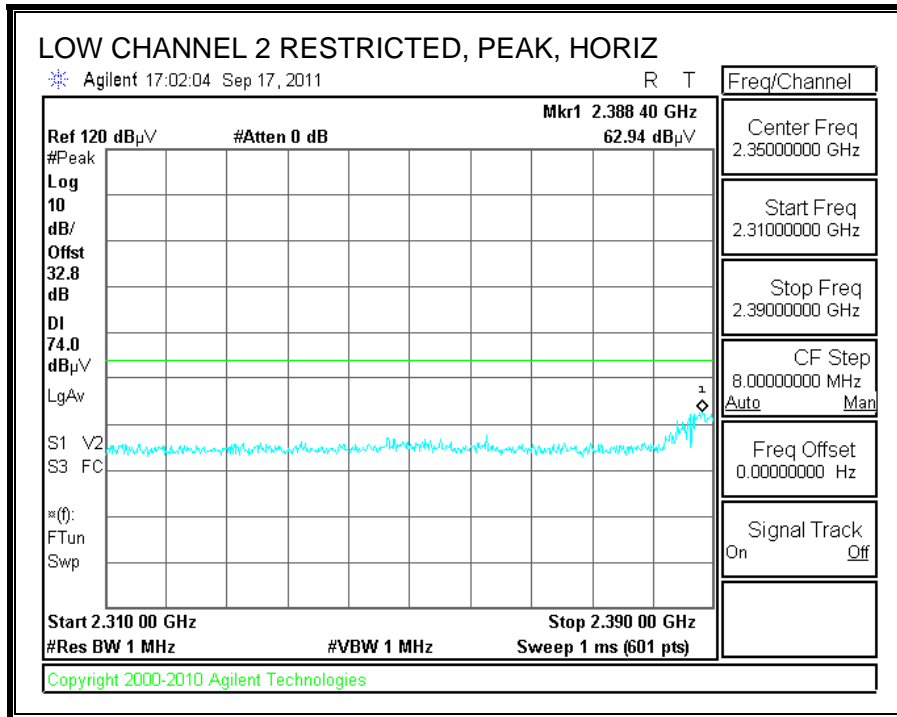


**RESTRICTED BANDEDGE (LOW CHANNEL 1, VERTICAL)**

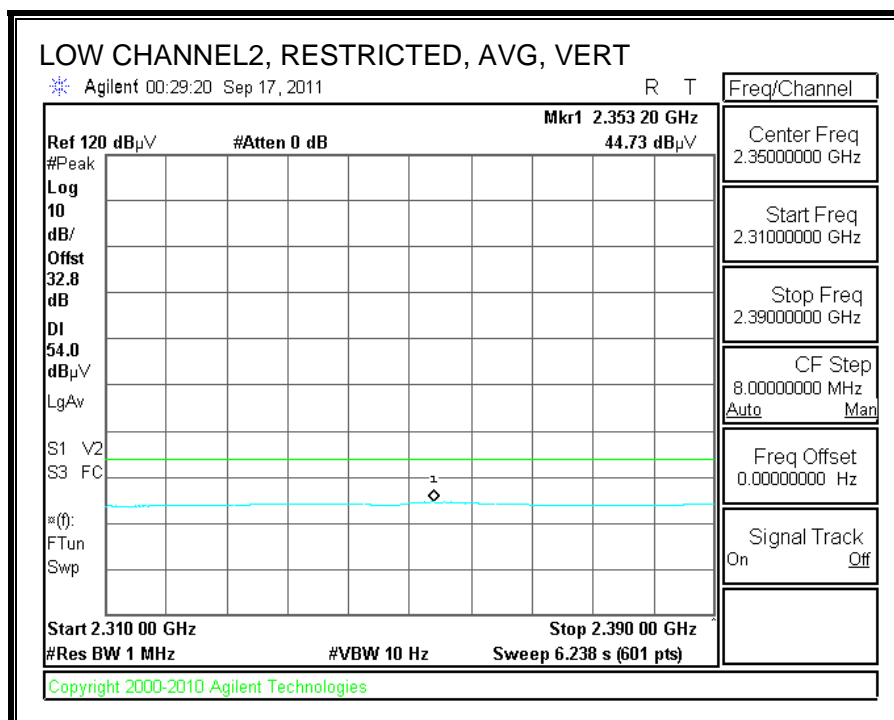
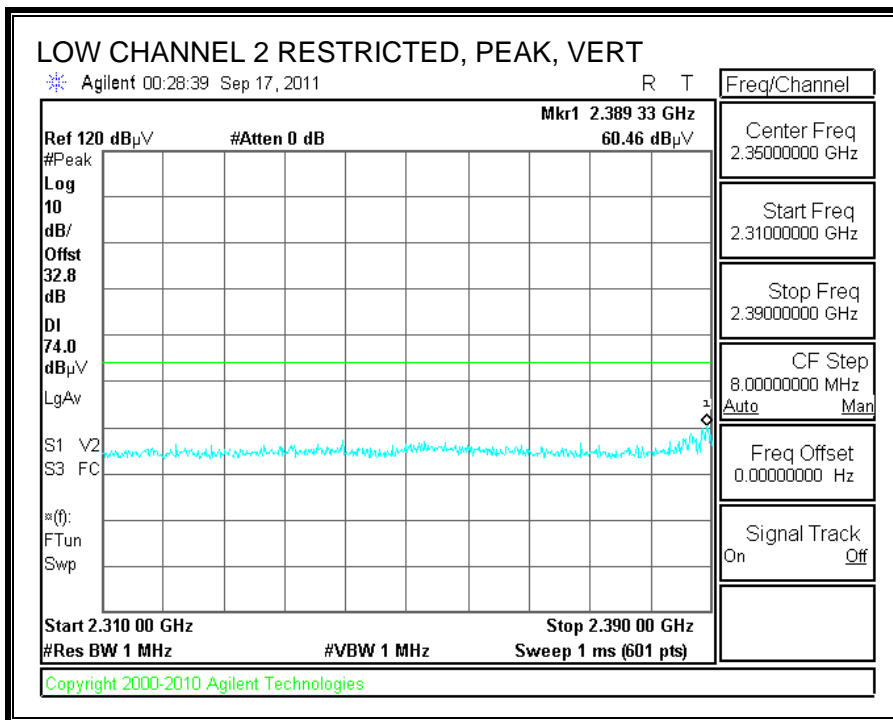




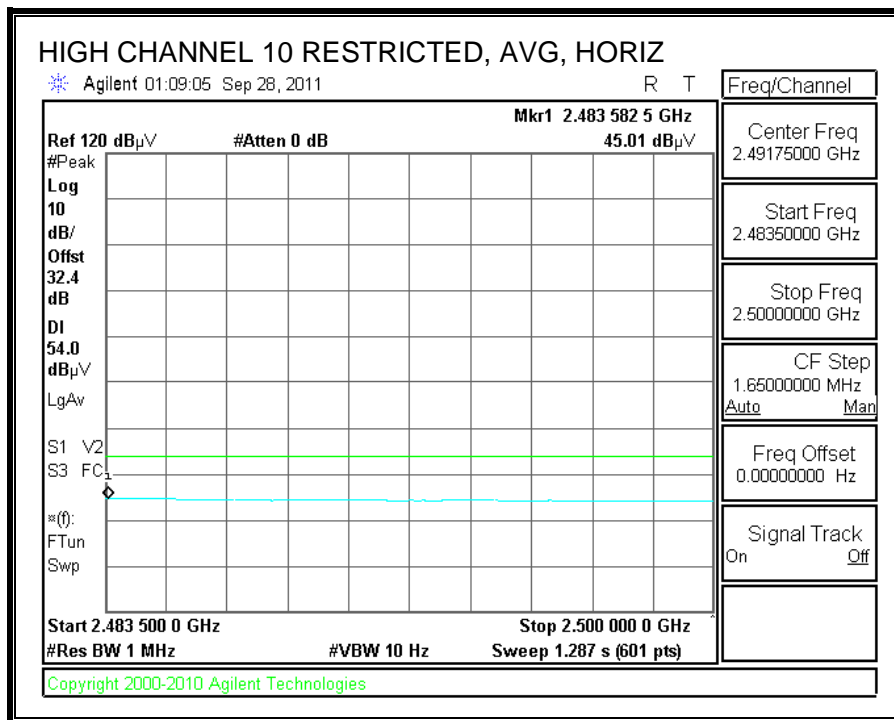
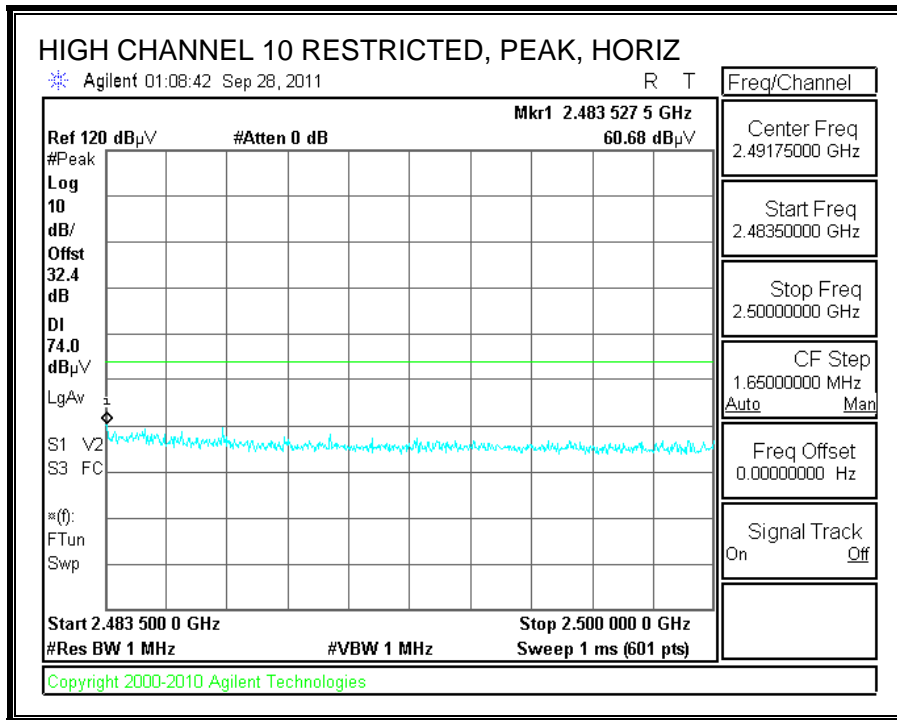
**RESTRICTED BANDEGE (LOW CHANNEL2, HORIZONTAL)**



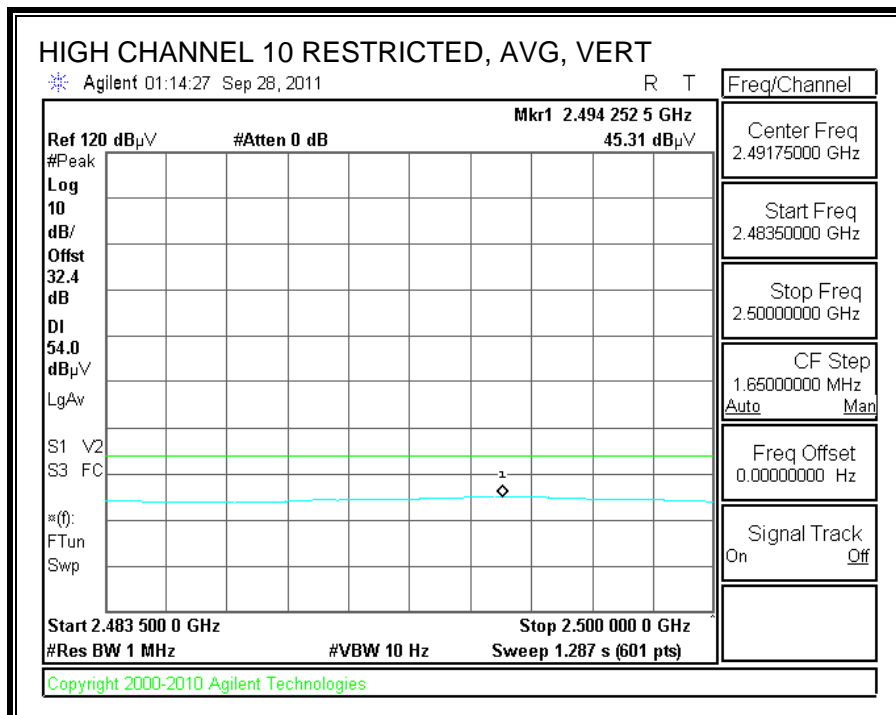
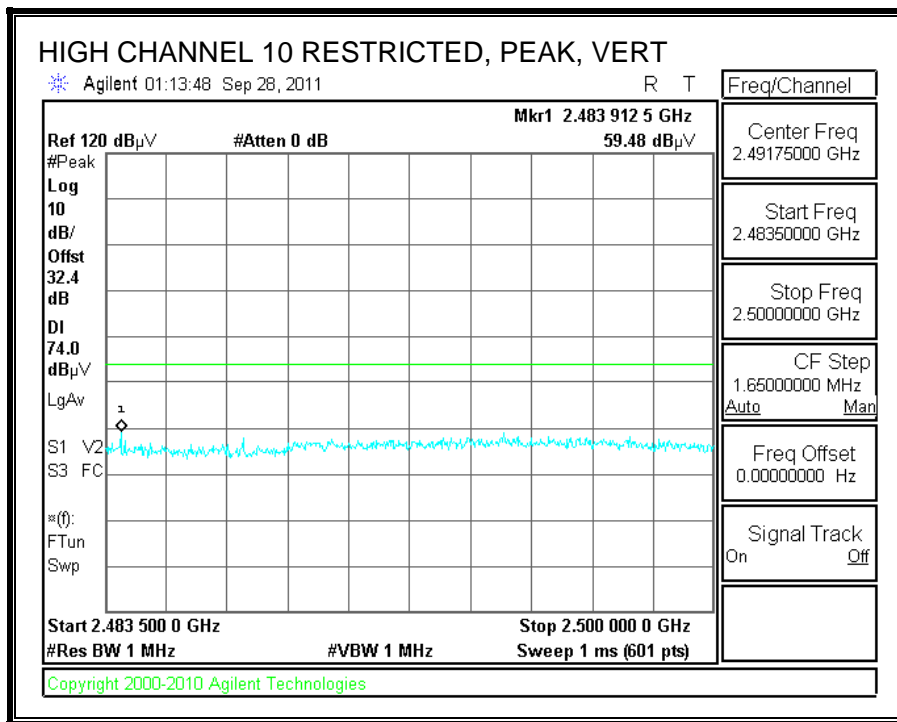
**RESTRICTED BANDEDGE (LOW CHANNEL 2, VERTICAL)**



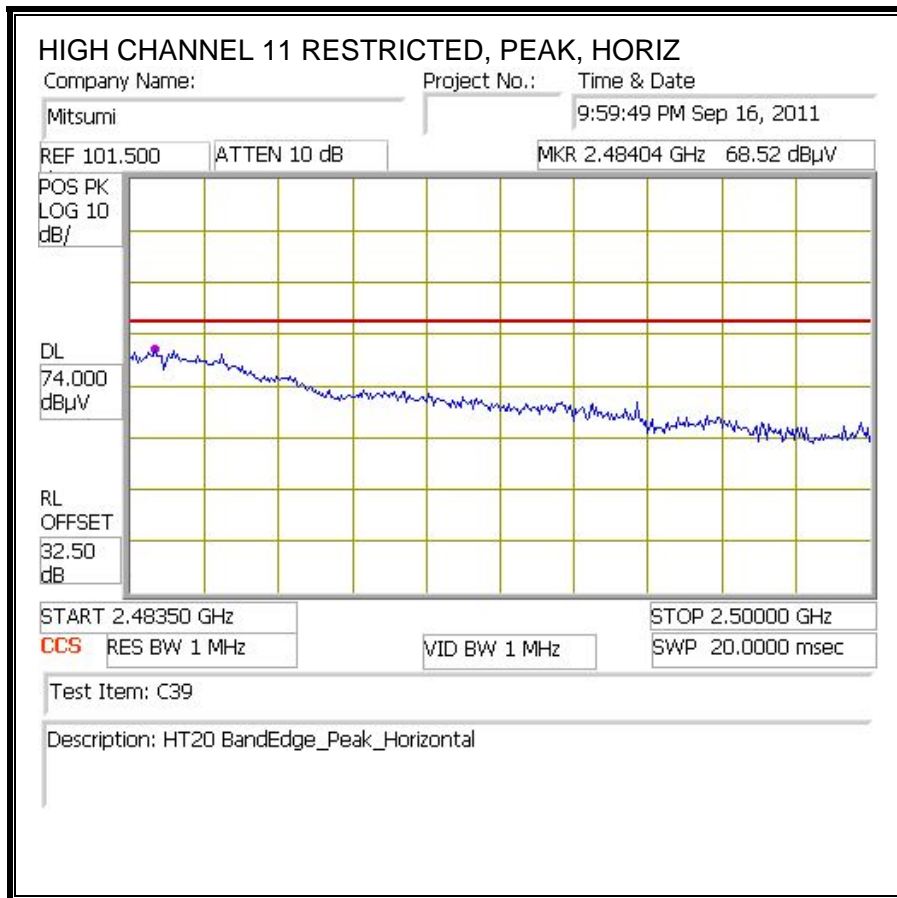
**RESTRICTED BANDEDGE (HIGH CHANNEL 10, HORIZONTAL)**

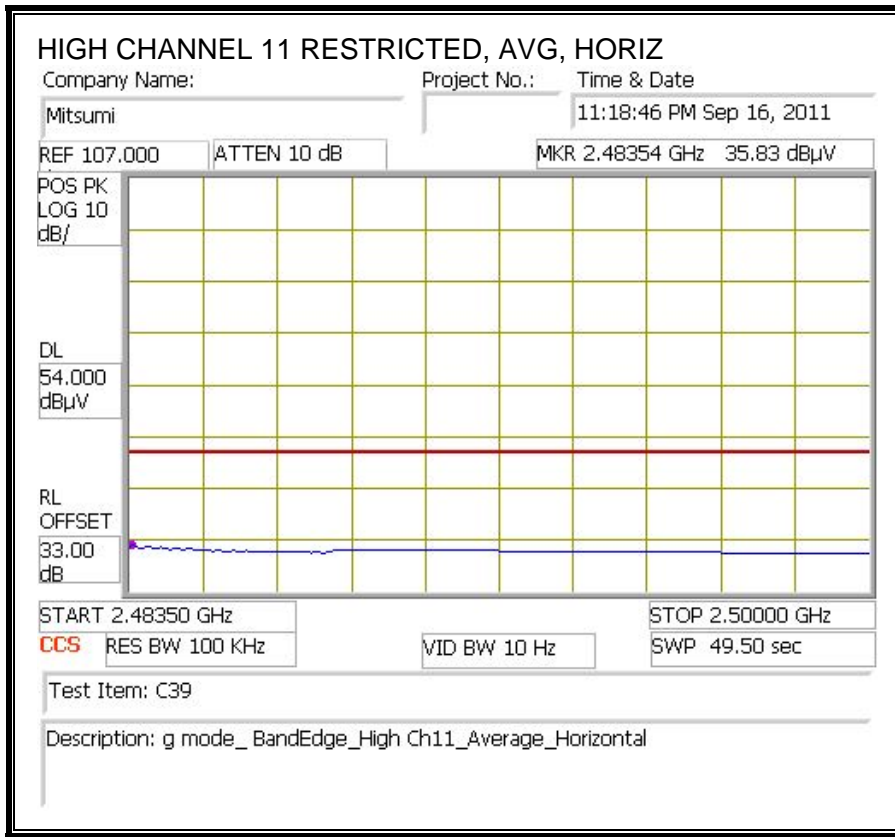


**RESTRICTED BANDEDGE (HIGH CHANNEL 10, VERTICAL)**

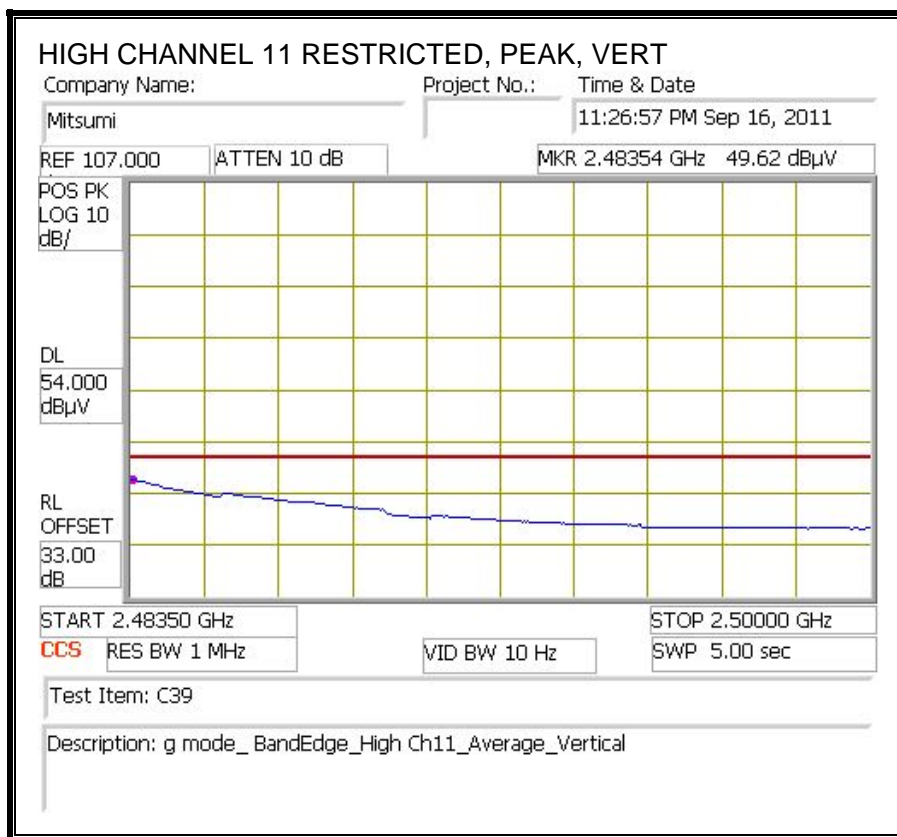


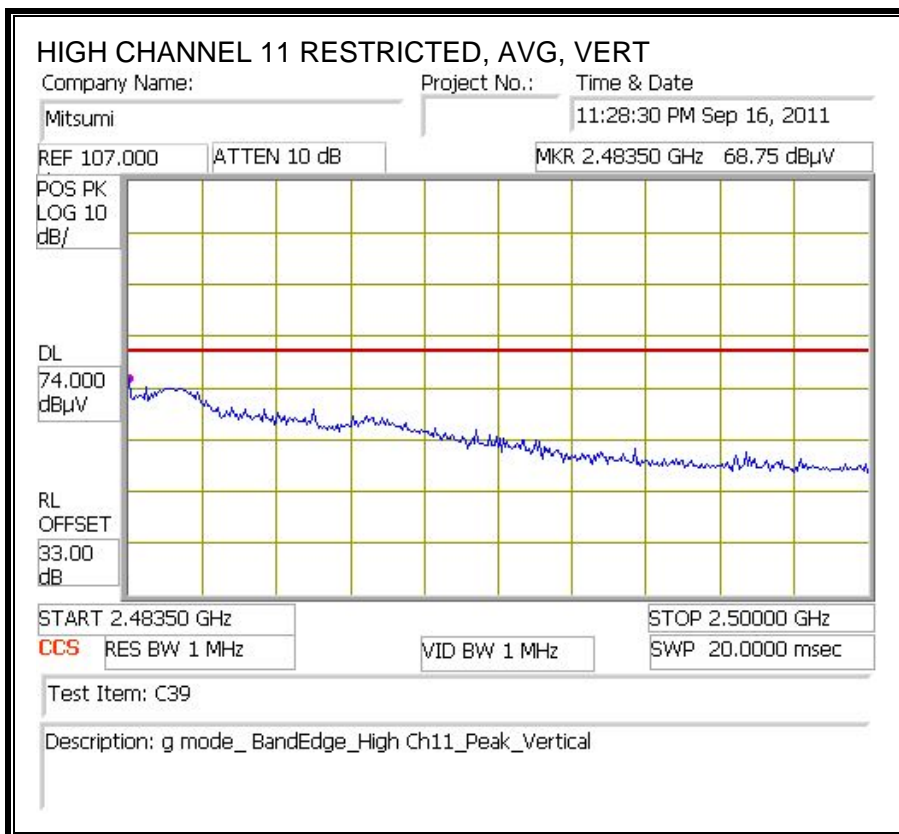
**RESTRICTED BANDEDGE (HIGH CHANNEL 11, HORIZONTAL)**





**RESTRICTED BANDEDGE (HIGH CHANNEL 11, VERTICAL)**







**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/17/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT and Support Laptop  
 Mode: Transmit HT 20

**Test Equipment:**

Horn 1-18GHz T60; S/N: 2238 @3m	Pre-amplifier 1-26GHz T34 HP 8449B	Pre-amplifier 26-40GHz	Horn > 18GHz T39; ARA 18-26GHz; S/N:1013	Limit FCC 16.206
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Hi Frequency Cables

3' cable 22807700 3' cable 22807700	12' cable 22807600 12' cable 22807600	20' cable 22807500 20' cable 22807500	HPF	Reject Filter R_001	<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz
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f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
1.200	3.0	56.1	40.8	25.4	3.0	-37.5	0.0	0.0	47.0	31.7	74	54	-27.0	-22.3	V
4.824	3.0	43.3	30.2	33.9	6.8	-34.1	0.0	0.0	49.9	36.8	74	54	-24.1	-17.2	V
12.060	3.0	35.3	25.4	39.7	11.9	-32.3	0.0	0.0	54.6	44.7	74	54	-19.4	-9.3	Noise floor
4.824	3.0	38.3	28.2	33.9	6.8	-34.1	0.0	0.0	44.9	34.8	74	54	-29.1	-19.2	H
12.060	3.0	36.2	25.1	39.7	11.9	-32.3	0.0	0.0	55.6	44.5	74	54	-18.4	-9.5	Noise floor
1.200	3.0	55.8	42.1	25.4	3.0	-37.5	0.0	0.0	46.7	33.0	74	54	-27.3	-21.0	H
<b>Mid Ch</b>															
4.874	3.0	45.2	28.3	33.9	6.8	-34.0	0.0	0.0	51.9	35.0	74	54	-22.1	-19.0	V
7.311	3.0	39.3	25.3	36.6	9.1	-33.1	0.0	0.0	51.8	37.9	74	54	-22.2	-16.1	Noise floor
4.874	3.0	40.2	26.4	33.9	6.8	-34.0	0.0	0.0	46.9	33.1	74	54	-27.1	-20.9	H
7.311	3.0	38.6	26.5	36.6	9.1	-33.1	0.0	0.0	51.2	39.1	74	54	-22.8	-14.9	Noise floor
<b>High Ch</b>															
4.924	3.0	45.0	31.2	34.0	6.8	-34.0	0.0	0.0	51.8	37.9	74	54	-22.2	-16.1	V
7.386	3.0	39.2	27.2	36.6	9.1	-33.1	0.0	0.0	51.9	39.9	74	54	-22.1	-14.1	Noise floor
4.924	3.0	42.4	29.4	34.0	6.8	-34.0	0.0	0.0	49.2	36.1	74	54	-24.8	-17.9	H
7.386	3.0	38.3	25.6	36.6	9.1	-33.1	0.0	0.0	50.9	38.2	74	54	-23.1	-15.8	Noise floor

Rev. 07.08.11

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		

### 8.5. RX ABOVE 1 GHz FOR 20 MHz BANDWIDTH IN THE 2.4 GHz BAND

Type A

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 3m Chamber

Company: Mitsumi  
 Project #: 11J14026  
 Date: 9/7/2011  
 Test Engineer: Thanh Nguyen  
 Configuration: EUT and Support Laptop  
 Mode: Receive mode

**Test Equipment:**

<b>Horn 1-18GHz</b> T60; S/N: 2238 @3m	<b>Pre-amplifer 1-26GHz</b> T34 HP 8449B	<b>Pre-amplifer 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b> RX RSS 210
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Hi Frequency Cables

<b>3' cable 22807700</b> 3' cable 22807700	<b>12' cable 22807600</b> 12' cable 22807600	<b>20' cable 22807500</b> 20' cable 22807500	<b>HPF</b>	<b>Reject Filter</b> R_001	<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz
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f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low ch</b>															
2.413	3.0	51.2	33.8	28.8	4.5	-35.7	0.0	0.0	48.9	31.4	74	54	-25.1	-22.6	V
2.500	3.0	48.5	33.2	29.1	4.6	-35.6	0.0	0.0	46.6	31.3	74	54	-27.4	-22.7	V
3.307	3.0	43.9	28.3	31.3	5.5	-35.0	0.0	0.0	45.6	30.0	74	54	-28.4	-24.0	V
3.320	3.0	45.8	30.1	31.3	5.5	-35.0	0.0	0.0	47.5	31.9	74	54	-26.5	-22.1	H
<b>Mid Ch</b>															
1.853	3.0	50.3	32.9	27.9	3.8	-36.5	0.0	0.0	45.5	28.0	74	54	-28.5	-26.0	H
2.540	3.0	43.8	34.5	29.2	4.7	-35.6	0.0	0.0	42.0	32.7	74	54	-32.0	-21.3	H
2.607	3.0	43.7	28.7	29.3	4.7	-35.6	0.0	0.0	42.3	27.2	74	54	-31.7	-26.8	H
2.407	3.0	48.5	33.8	28.8	4.5	-35.7	0.0	0.0	46.2	31.5	74	54	-27.8	-22.5	V
2.493	3.0	47.3	33.6	29.0	4.6	-35.6	0.0	0.0	45.3	31.6	74	54	-28.7	-22.4	V
<b>High Ch</b>															
3.313	3.0	45.1	31.2	31.3	5.5	-35.0	0.0	0.0	46.9	33.0	74	54	-27.1	-21.0	V
2.413	3.0	45.6	31.3	28.8	4.5	-35.7	0.0	0.0	43.2	28.9	74	54	-30.8	-25.1	H

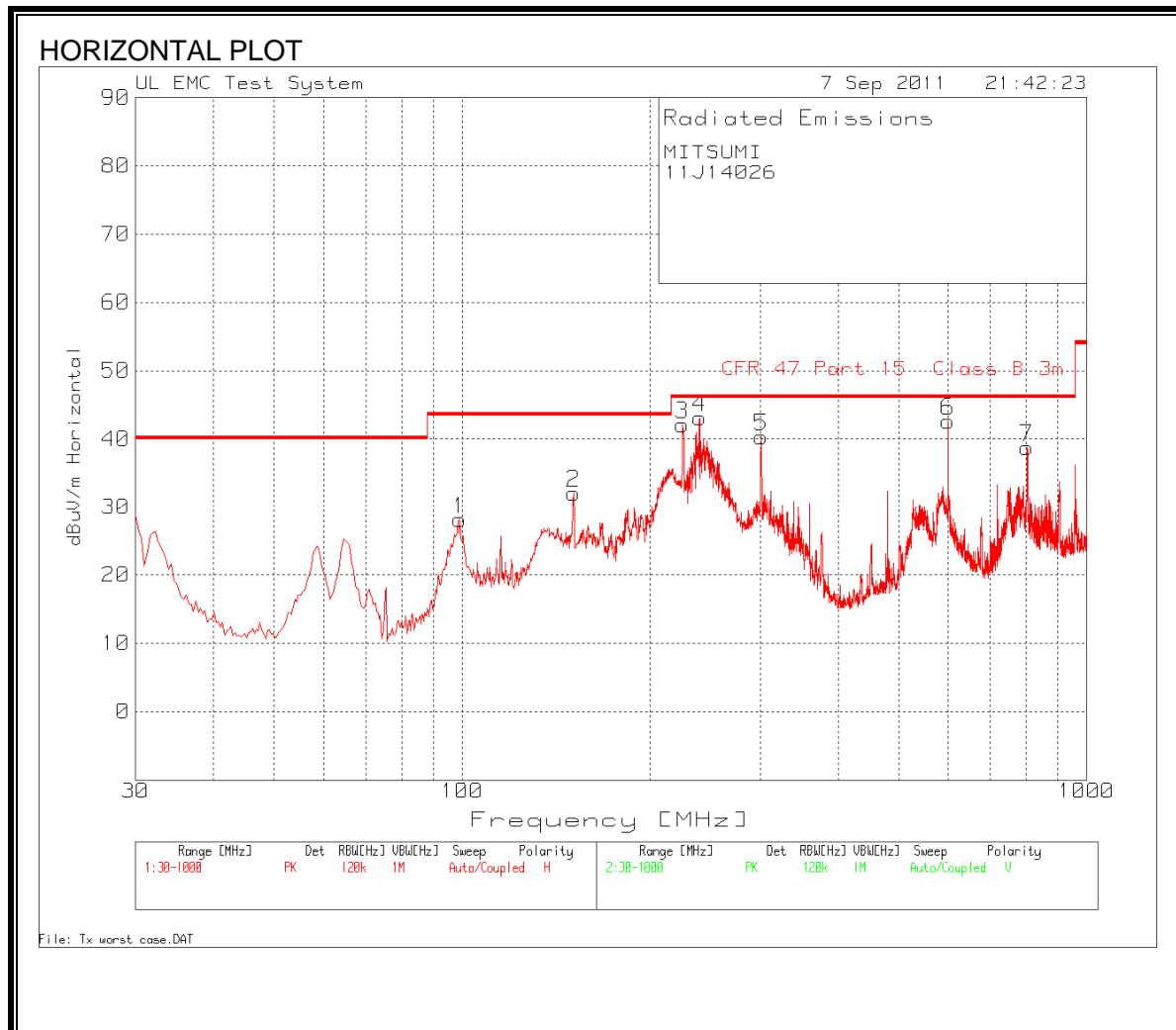
Rev. 07.08.11

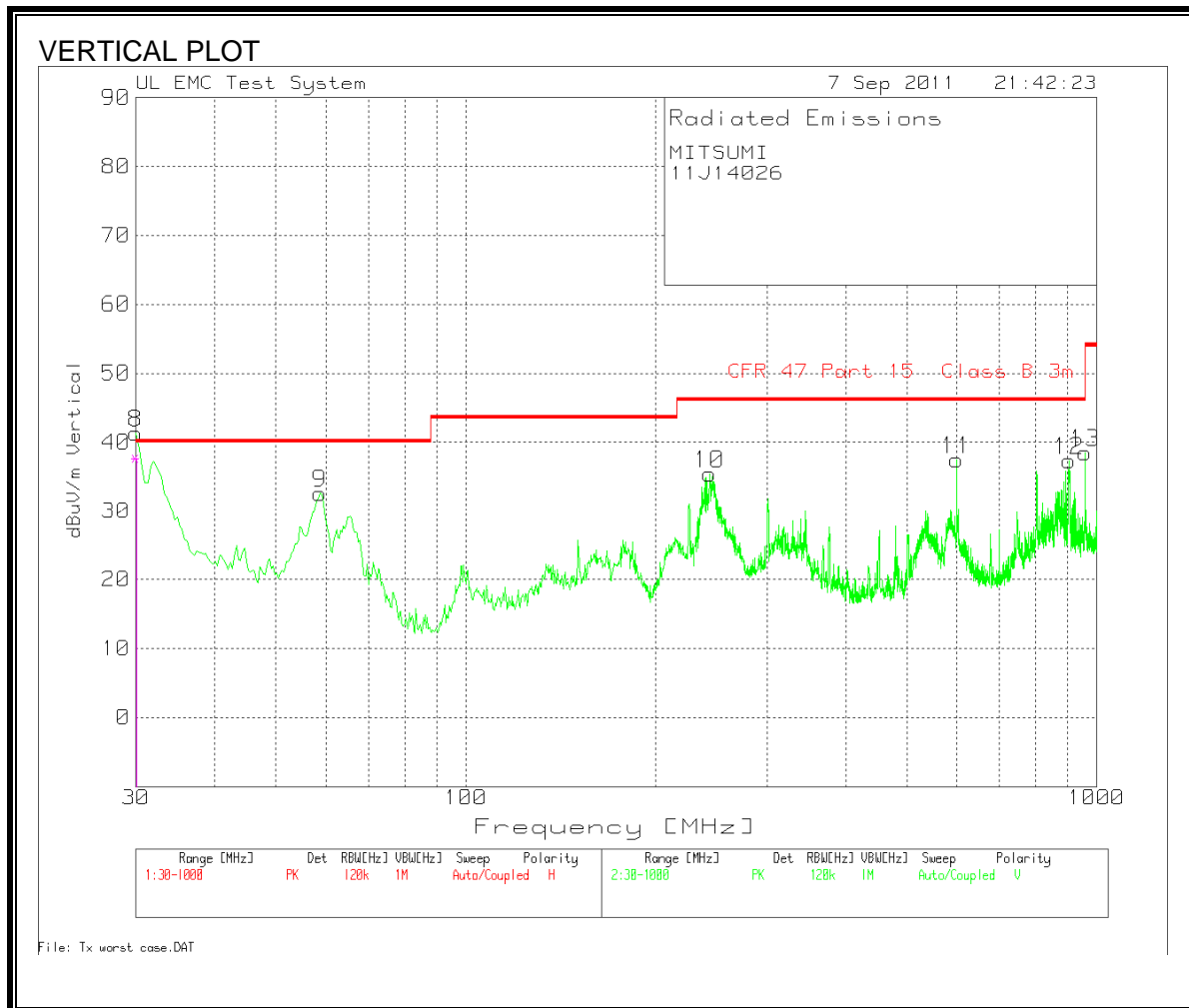
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

### 8.6. WORST-CASE BELOW 1 GHz

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

Type A





HORIZONTAL AND VERTICAL DATA										
MITSUMI										
11J14026										
Range 1 30 - 1000MHz										
Test	Meter	Detector	5m Cable	5m T64	5m Bilog	dBuV/m	CFR 47	Margin	Height	Polarity
Frequency	Reading		loss	PreAmp	below 1GHz		Part 15		[cm]	
			[dB]	[dB]	[dB]		Class B 3m			
99.1472	46.05	PK	1	-28.1	9.2	28.15	43.5	-15.35	130	Horz
150.8461	45.97	PK	1.2	-27.8	12.7	32.07	43.5	-11.43	130	Horz
225.4863	56.19	PK	1.5	-27.5	11.9	42.09	46	-3.91	130	Horz
301.0959	52.26	PK	1.8	-27.3	13.5	40.26	46	-5.74	130	Horz
599.98	50.08	PK	2.5	-28.4	18.4	42.58	46	-3.42	130	Horz
803.8674	42.96	PK	2.9	-28	20.9	38.76	46	-7.24	130	Horz
Range 2 30 - 1000MHz										
Test	Meter	Detector	5m Cable	5m T64	5m Bilog	dBuV/m	CFR 47	Margin	Height	Polarity
Frequency	Reading		loss	PreAmp	below 1GHz		Part 15		[cm]	
			[dB]	[dB]	[dB]		Class B 3m			
58.7575	51.94	PK	0.8	-28.2	8.1	32.64	40	-7.36	102	Vert
243.5809	49.51	PK	1.6	-27.5	11.8	35.41	46	-10.59	102	Vert
599.98	44.93	PK	2.5	-28.4	18.4	37.43	46	-8.57	102	Vert
904.034	39.71	PK	3.2	-27.7	22.1	37.31	46	-8.69	102	Vert
959.9334	40.27	PK	3.2	-27.5	22.5	38.47	46	-7.53	102	Vert

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

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

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

ANSI C63.4

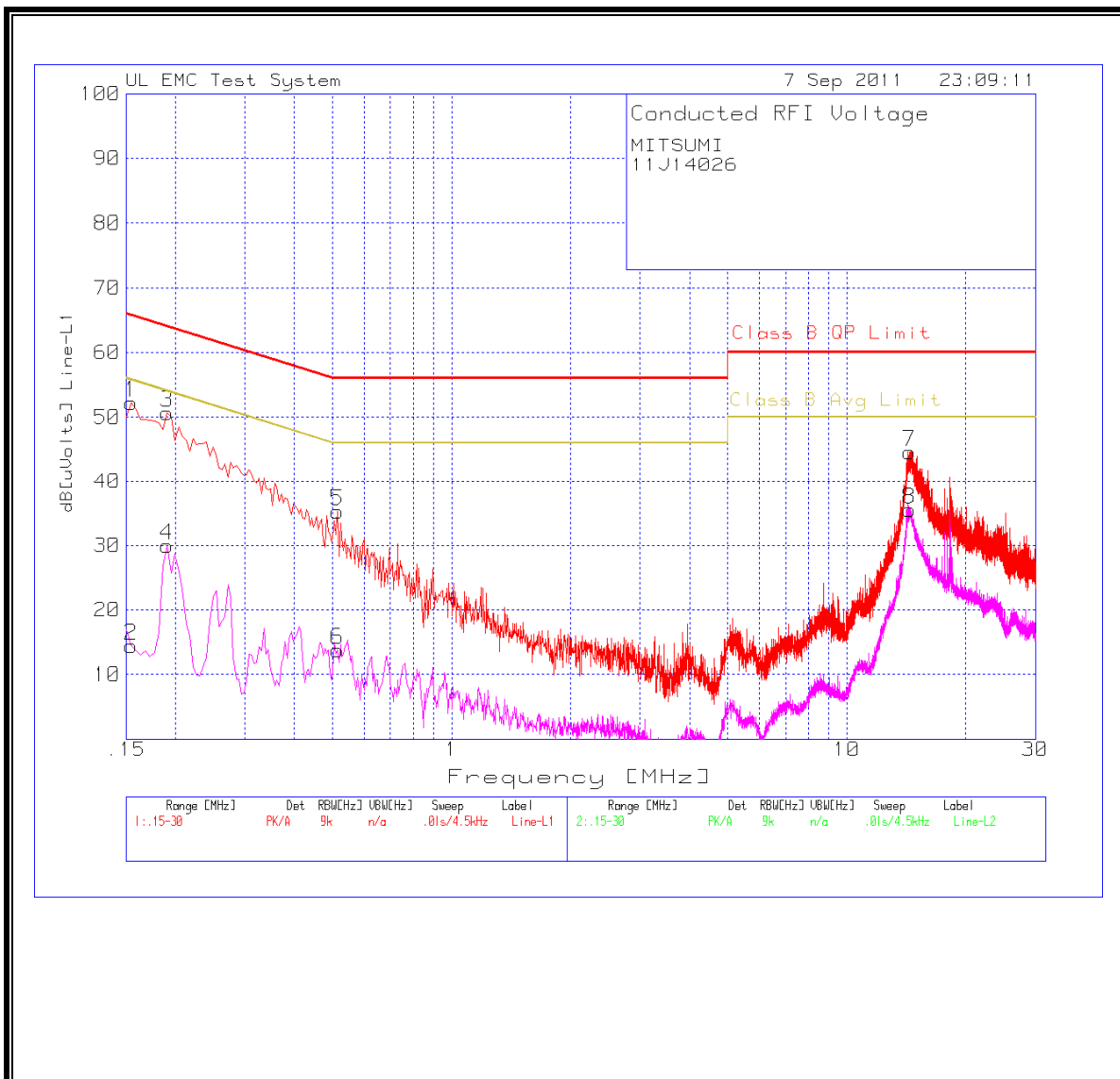
### RESULTS

#### Type A

**6 WORST EMISSIONS**

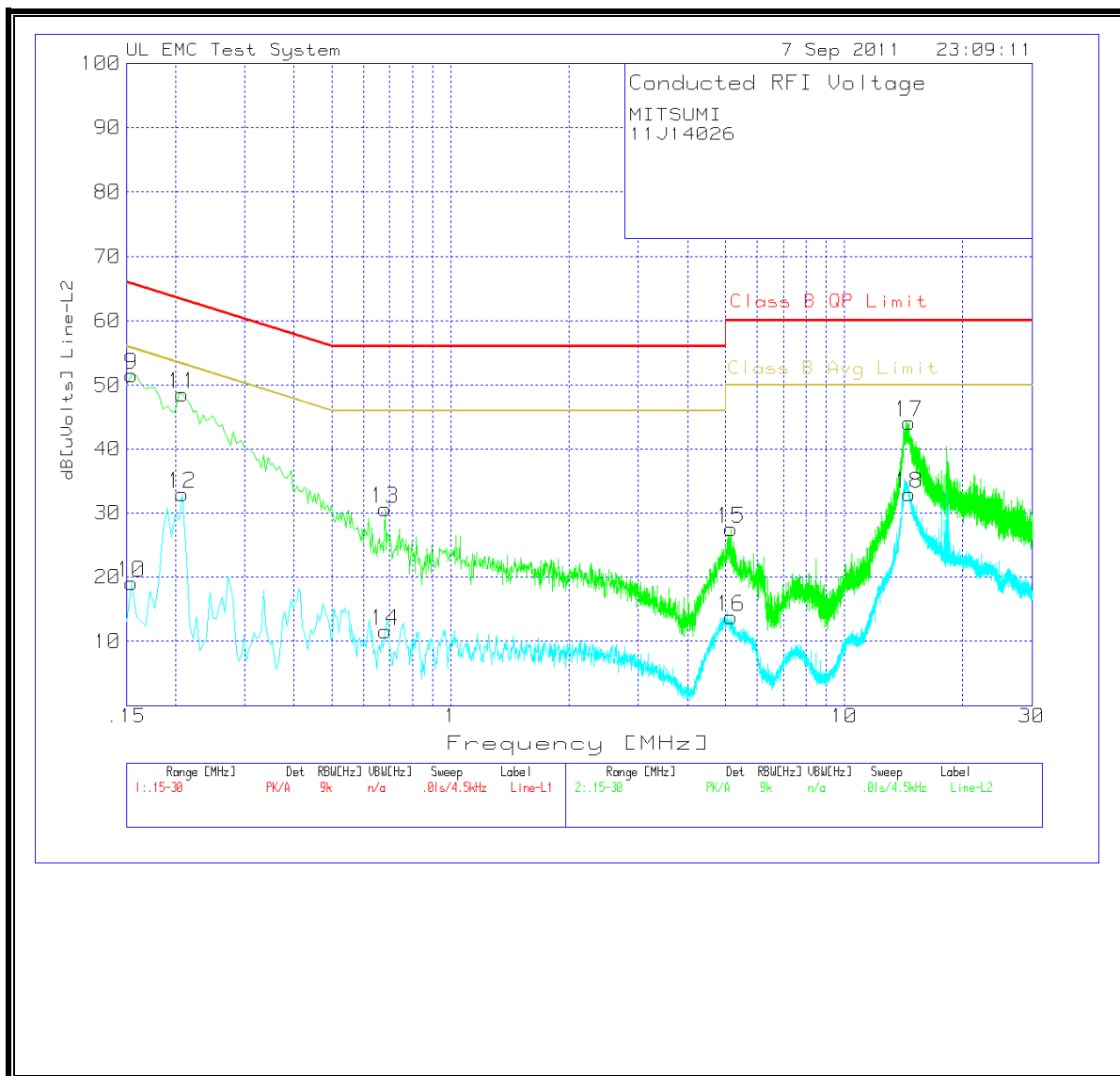
MITSUMI 11J14026									
Line-L1 .15 - 30MHz									
Test Freq. (MHz)	Meter Reading	Detector	LISN [dB]	Conduct ed Emission Cable	Correct Reading (dBuVolts)	Class B Quasi-peak Limit	Quasi-Peak Margin	Class B Average Limit	Average Margin
0.1545	52.27	PK	0	0	52.27	65.8	-13.53	55.8	-3.53
0.1545	14.48	Av	0	0	14.48	65.8	-51.32	55.8	-41.32
0.1905	50.74	PK	0	0	50.74	64	-13.26	54	-3.26
0.1905	29.92	Av	0	0	29.92	64	-34.08	54	-24.08
0.5145	35.24	PK	0	0	35.24	56	-20.76	46	-10.76
0.5145	13.8	Av	0	0	13.8	56	-42.2	46	-32.2
14.397	44.57	PK	0	0	44.57	60	-15.43	50	-5.43
14.397	35.51	Av	0	0	35.51	60	-24.49	50	-14.49
Line-L2 .15 - 30MHz									
Test Freq. (MHz)	Meter Reading	Detector	LISN [dB]	Conduct ed Emission Cable	Correct Reading (dBuVolts)	Class B Quasi-peak Limit	Quasi-Peak Margin	Class B Average Limit	Average Margin
0.1545	51.63	PK	0	0	51.63	65.8	-14.17	55.8	-4.17
0.1545	19.12	Av	0	0	19.12	65.8	-46.68	55.8	-36.68
0.2085	48.6	PK	0	0	48.6	63.3	-14.7	53.3	-4.7
0.2085	32.96	Av	0	0	32.96	63.3	-30.34	53.3	-20.34
0.681	30.62	PK	0	0	30.62	56	-25.38	46	-15.38
0.681	11.55	Av	0	0	11.55	56	-44.45	46	-34.45
5.154	27.53	PK	0	0	27.53	60	-32.47	50	-22.47
5.154	13.83	Av	0	0	13.83	60	-46.17	50	-36.17
14.5905	44.18	PK	0	0	44.18	60	-15.82	50	-5.82
14.5905	32.93	Av	0	0	32.93	60	-27.07	50	-17.07

**LINE 1 RESULTS**





**LINE 2 RESULTS**



## 10. MAXIMUM PERMISSIBLE EXPOSURE

### FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....			f/300	6
1500–100,000 .....			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30

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

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

f = frequency in MHz

\* = Plane-wave equivalent power density

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

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

**IC RULES**

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

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

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

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

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

**EQUATIONS**

Power density is given by:

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

where

- S = Power density in W/m<sup>2</sup>
- EIRP = Equivalent Isotropic Radiated Power in W
- D = Separation distance in m

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

Distance is given by:

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

where

- D = Separation distance in m
- EIRP = Equivalent Isotropic Radiated Power in W
- S = Power density in W/m<sup>2</sup>

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

**LIMITS**

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

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

**RESULTS**

Band	Mode	Separation Distance (m)	Average Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m <sup>2</sup> )	FCC Power Density (mW/cm <sup>2</sup> )
2.4 GHz	b mode	0.20	14.44	1.41	0.08	0.008
2.4 GHz	g mode	0.20	14.50	1.41	0.08	0.008
2.4 GHz	HT20	0.20	14.25	1.41	0.07	0.007