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

FOR

WIFI MODULE

MODEL NUMBER: DWM-W016

FCC ID: EW4DWMW016
IC: 4250A-DWMW016

REPORT NUMBER: 08J12194-1

ISSUE DATE: NOVEMBER 06, 2008

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

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

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/06/08	Initial Issue	T. Chan

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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: WiFi MODULE

MODEL: DWM-W016

SERIAL NUMBER: 1

DATE TESTED: OCTOBER 25-30, 2008

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

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g transceiver operating in the 2400-2484 MHz band.
The radio module is manufactured by Mitsumi Electric Co.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major changes filed under this application are:

Change #1: Adding over current protection for U7
Replace Ferrite Bead (FB6) to Fuse (F1).

Change #2: Failure prevention of U7 by an excessive input
Following parts are substitution.

R25: 0 ohm to 2.7k ohm
C65: 180pF to Open
C66: Open to 100pF

5.3. MAXIMUM OUTPUT POWER

The test measurement passed within ± 0.5dBm of the original output power.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the following antennas:

- Dipole antenna, model: DCA-P04, Gain: -0.49
- Sleeve antenna, model: DCA-P10, Gain: +2.01
- PIFA 1 antenna, model: 361.00094.005, Gain: +1.899
- PIFA 2 antenna, model: 361.00095.005, Gain: -0.012

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was BCMWL5.SYS: Ver. 4.10.34.2.

The test utility software used during testing was WL_TOOL: Ver 4.10 R50.0 and epi_ttcp: Ver. 3.8.

5.6. WORST-CASE CONFIGURATION AND MODE

For Radiated Emissions testing above 1 GHz, the following configurations of EUT with antennas was tested:

Configuration 1: Sleeve antenna and Dipole antenna were connected to the EUT; EUT was set to transmit via Sleeve antenna.

Configuration 2: Sleeve antenna and Dipole antenna were connected to the EUT; EUT was set to transmit via Dipole antenna.

Configuration 3: 2 PIFA antennas were connected to the EUT; EUT was set to transmit via higher gain PIFA (1.899 dBi).

For Radiated Emissions below 1 GHz and Power Line Conducted Emissions, worst-case of the three configurations above was used (configuration 1)

For 11b mode, 1 Mbps was used as worst-case data rate.
For 11g mode, 6 Mbps was used as worst-case data rate.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Desktop PC	Dell	DC8M	JWJJ8BX	DoC
Keyboard	Dell	SK-8110	CN-07N247-71616-442-OKFL	DoC
Mouse	Dell	M-UR69	LM3230699	DoC
Monitor	LG	L1750S	512MXWE0A763	BEJL17NP

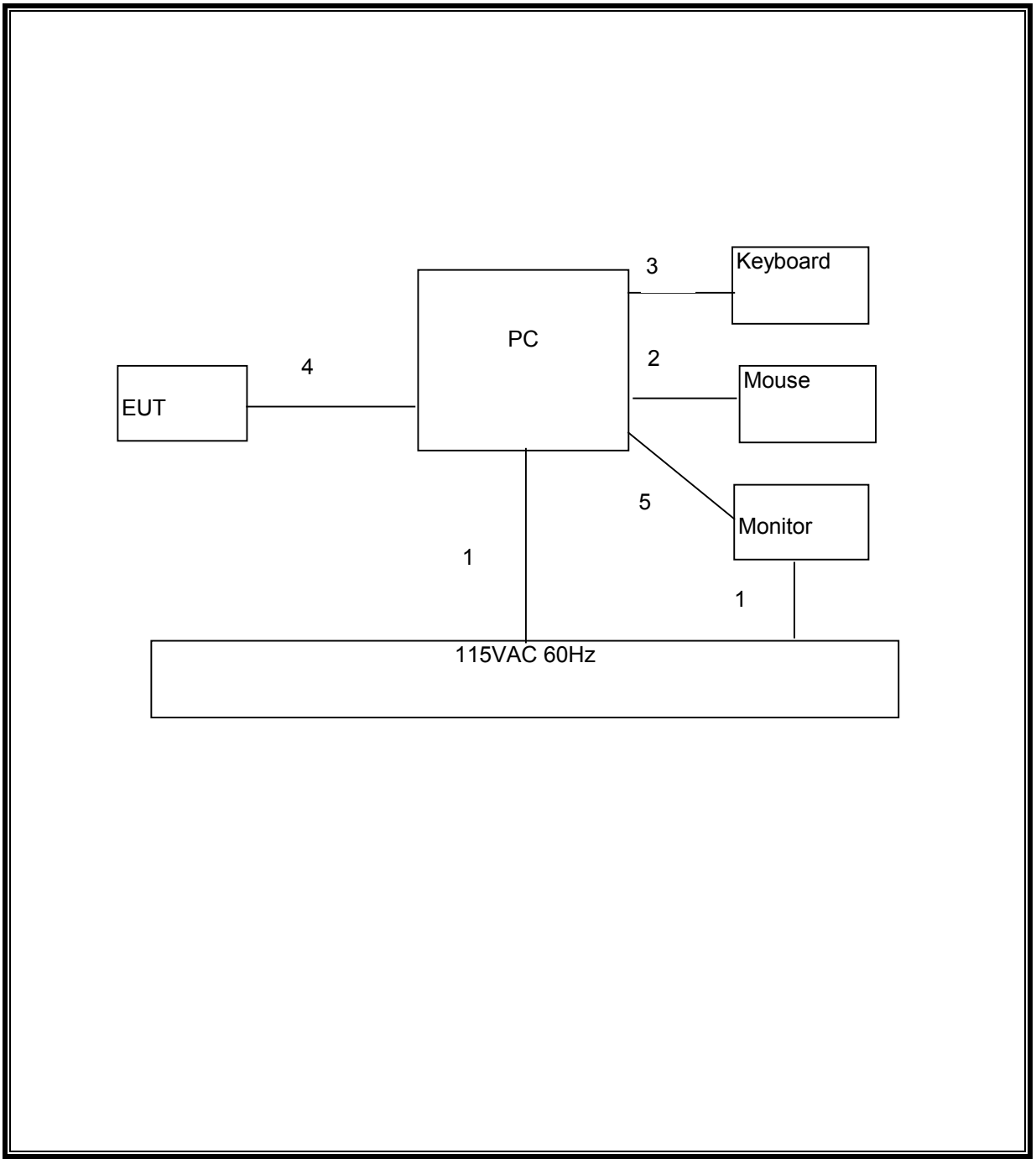
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	2m	N/A
2	USB	1	Mouse	Shielded	1m	N/A
3	USB	1	Keyboard	Un-shielded	1m	N/A
4	20 Pins Connector	1	Ribbon cable	Un-shielded	0.5m	N/A
5	Video	1	Monitor	Un-shielded	2m	One Ferrite at each end

TEST SETUP

The EUT was installed onto a test JIG and connected to a host laptop computer via a ribbon cable. Test software was used to control the radio card during the testing.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	11/27/08
Antenna, Horn, 18 GHz	ETS	3117	C01006	04/22/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/11/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	03/03/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/25/08
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4407B	C01101	01/22/09
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/07/09
Peak Power Meter	Agilent / HP	E4416A	C00963	12/04/09
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR

6.1. 802.11b MODE IN THE 2.4 GHz BAND

6.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

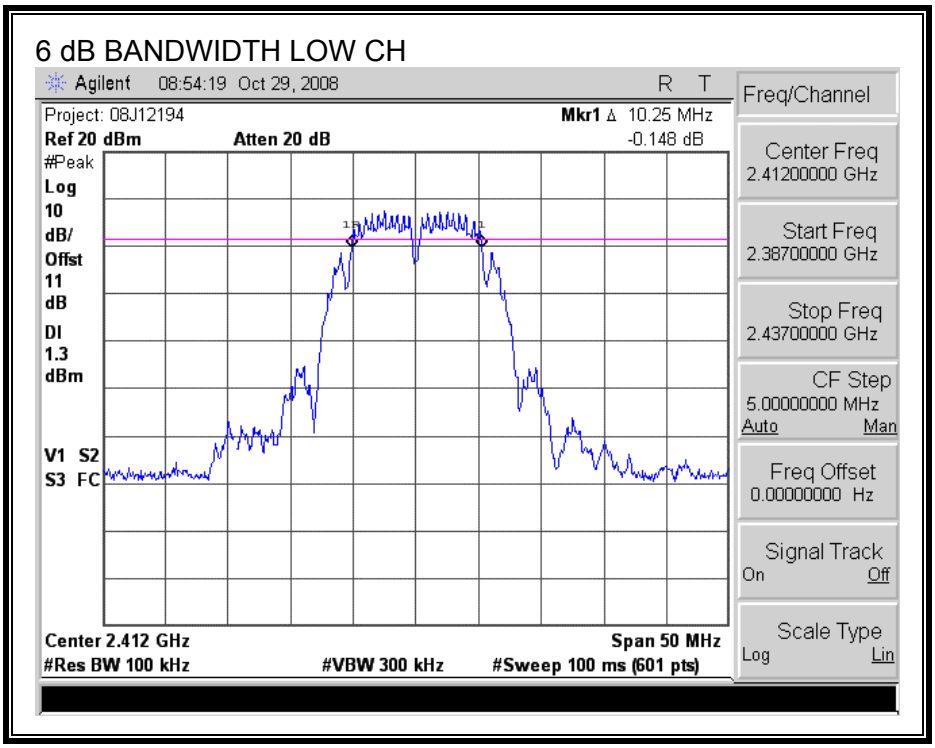
TEST PROCEDURE

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

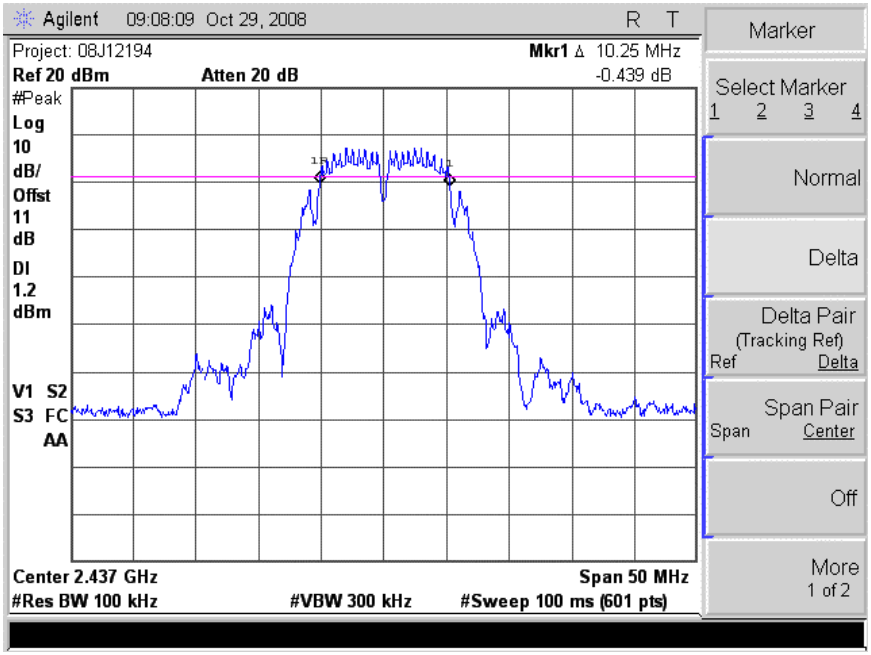
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	10.25	0.5
Middle	2437	10.25	0.5
High	2462	10.25	0.5

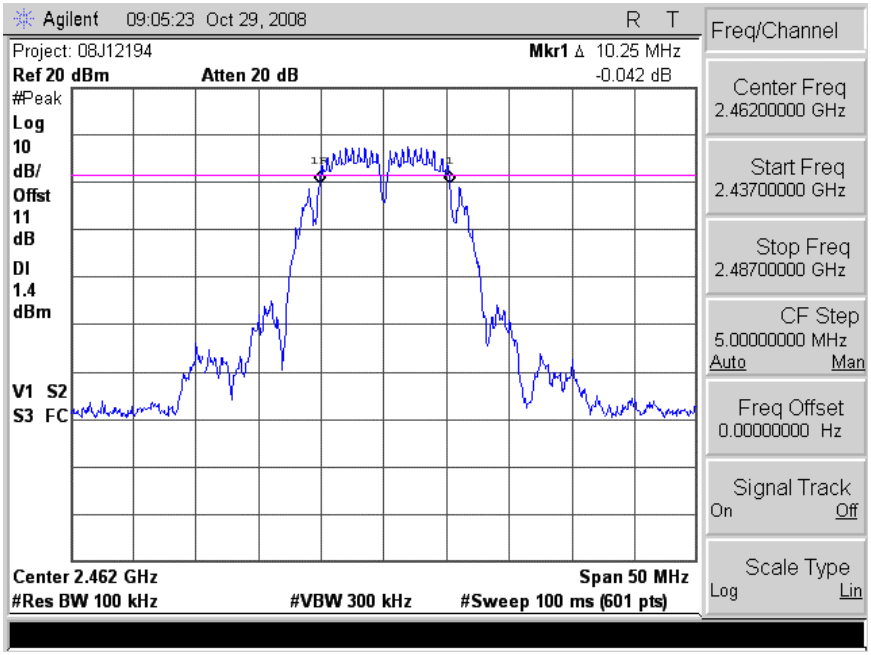
6 dB BANDWIDTH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



6.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

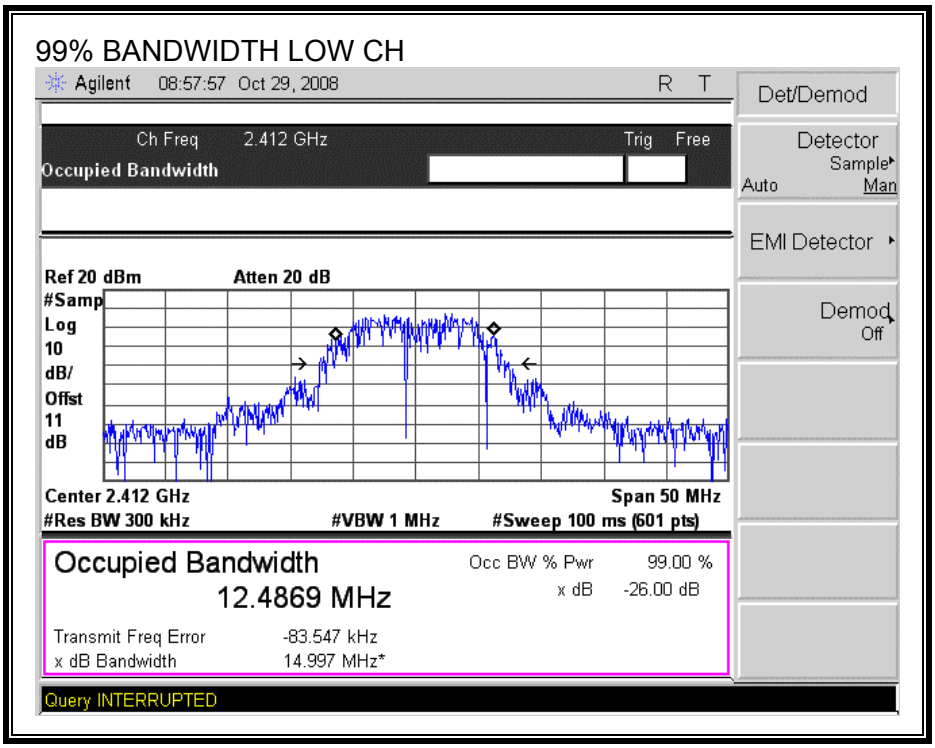
TEST PROCEDURE

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

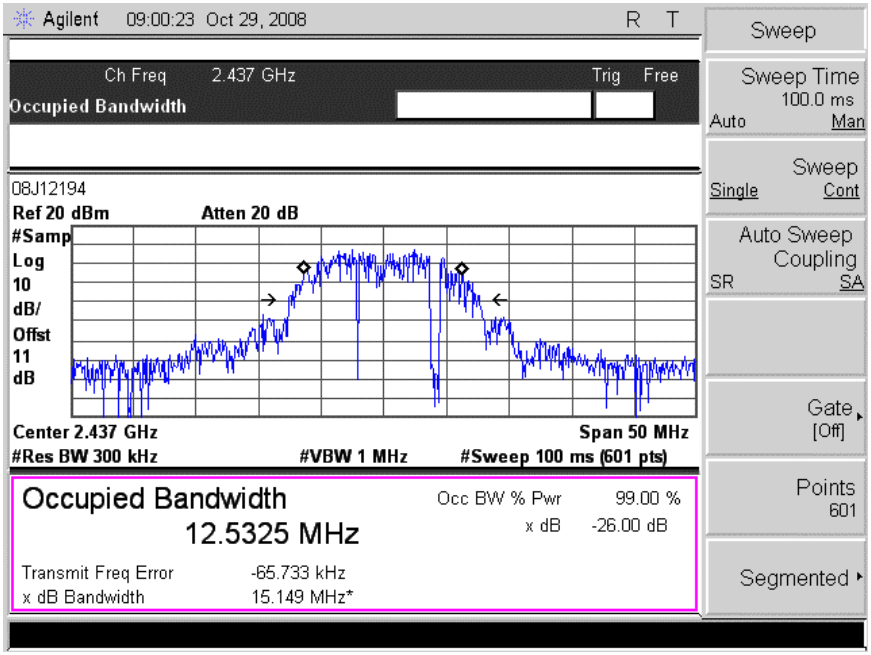
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.4869
Middle	2437	12.5325
High	2462	12.4849

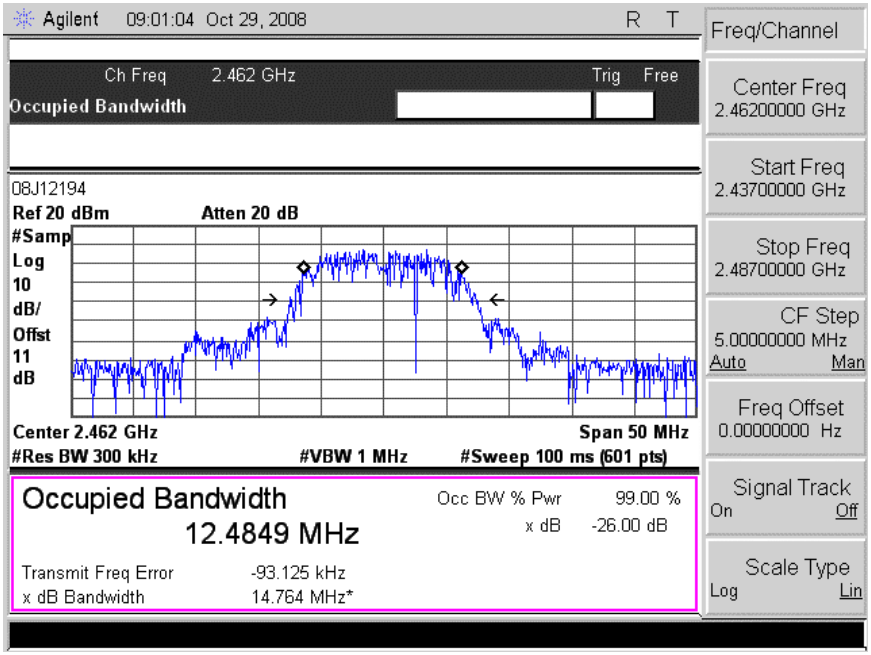
99% BANDWIDTH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



6.1.3. 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 11dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	16.20
Middle	2437	16.20
High	2462	16.26

6.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

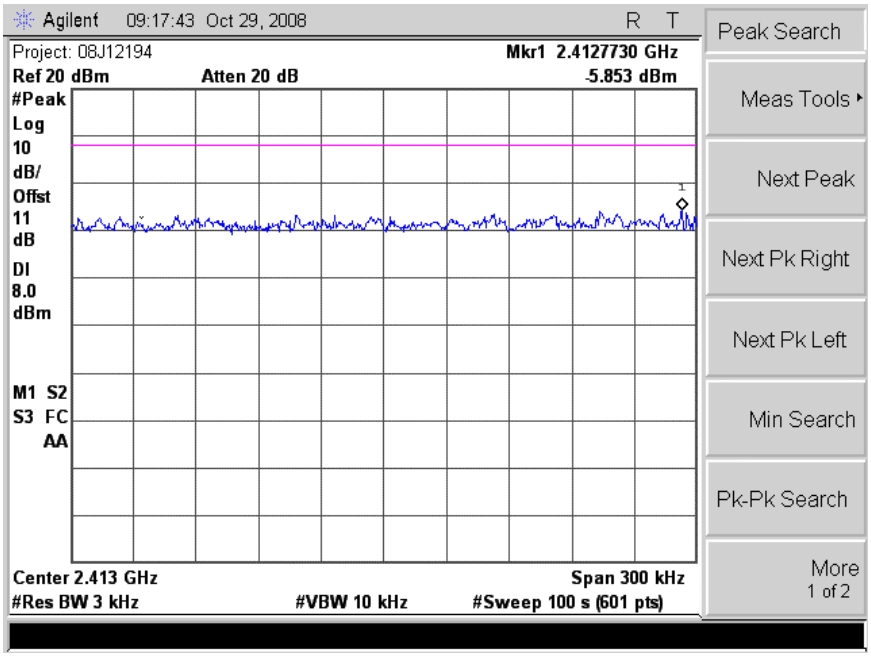
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

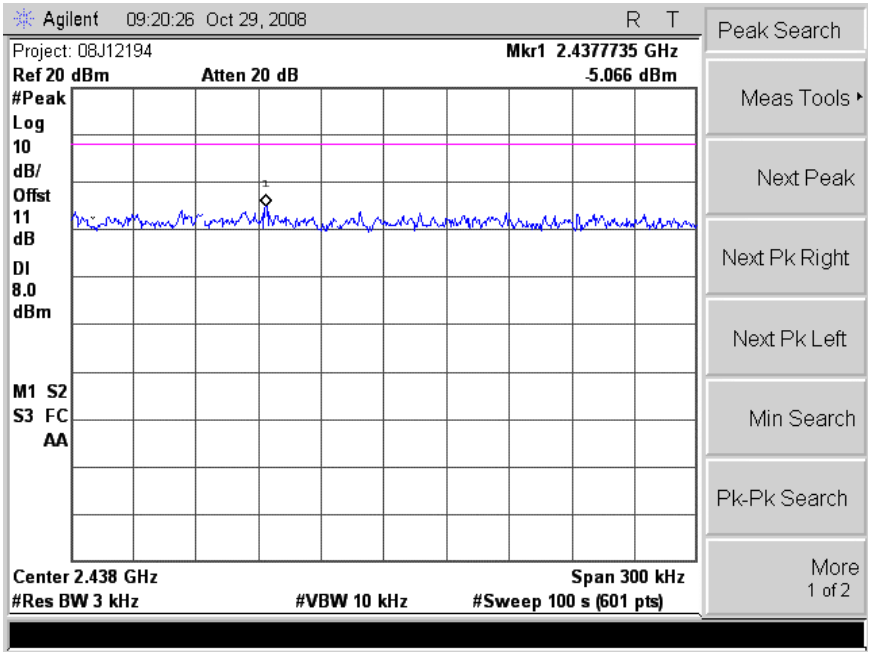
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.85	8	-13.85
Middle	2437	-5.07	8	-13.07
High	2462	-6.13	8	-14.13

POWER SPECTRAL DENSITY

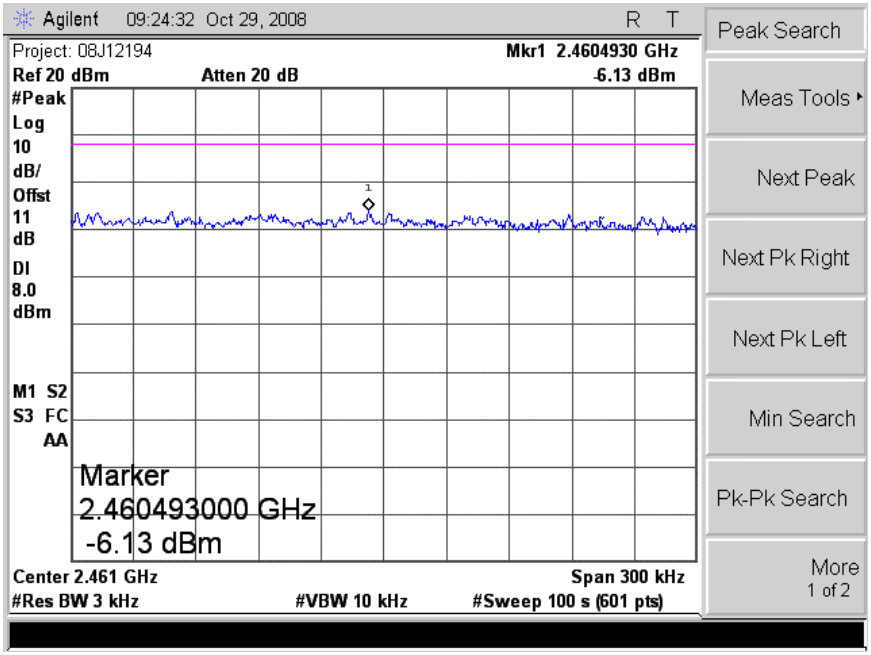
PSD LOW CH



PSD MID CH



PSD HIGH CH



6.1.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

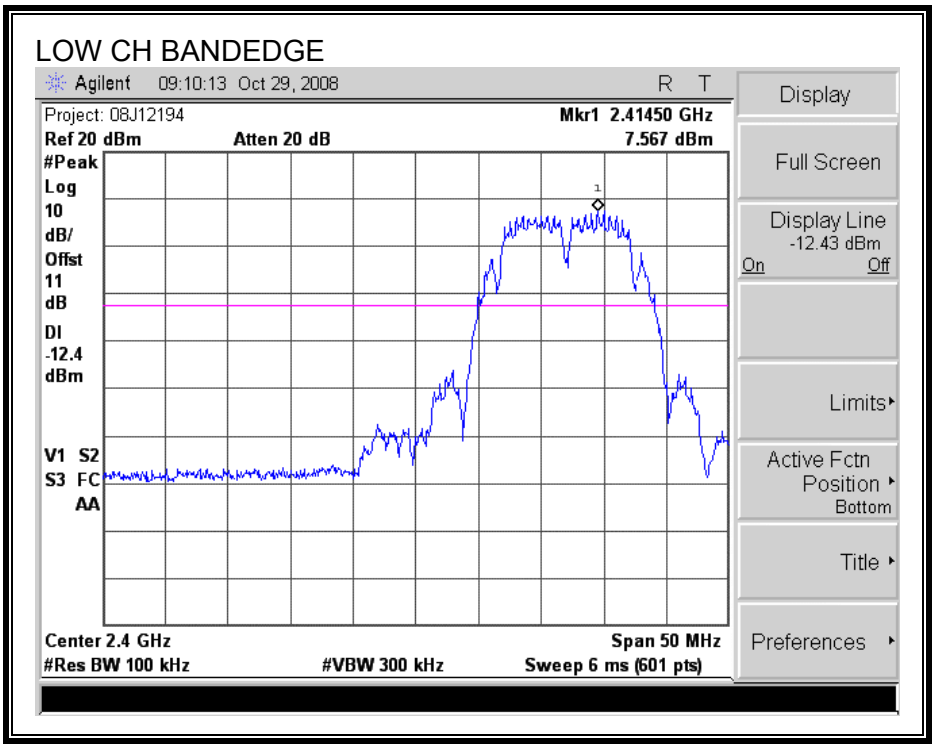
TEST PROCEDURE

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

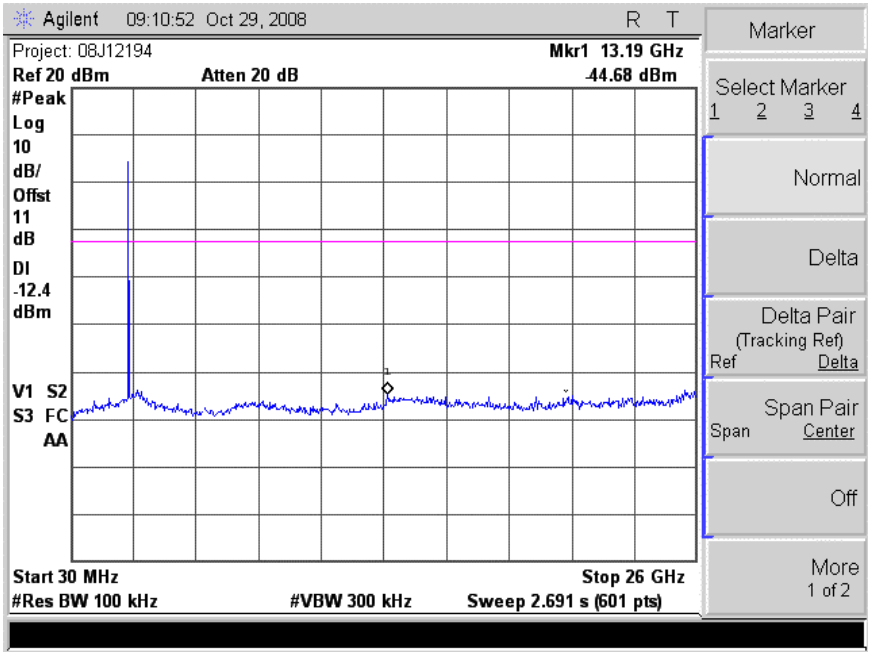
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

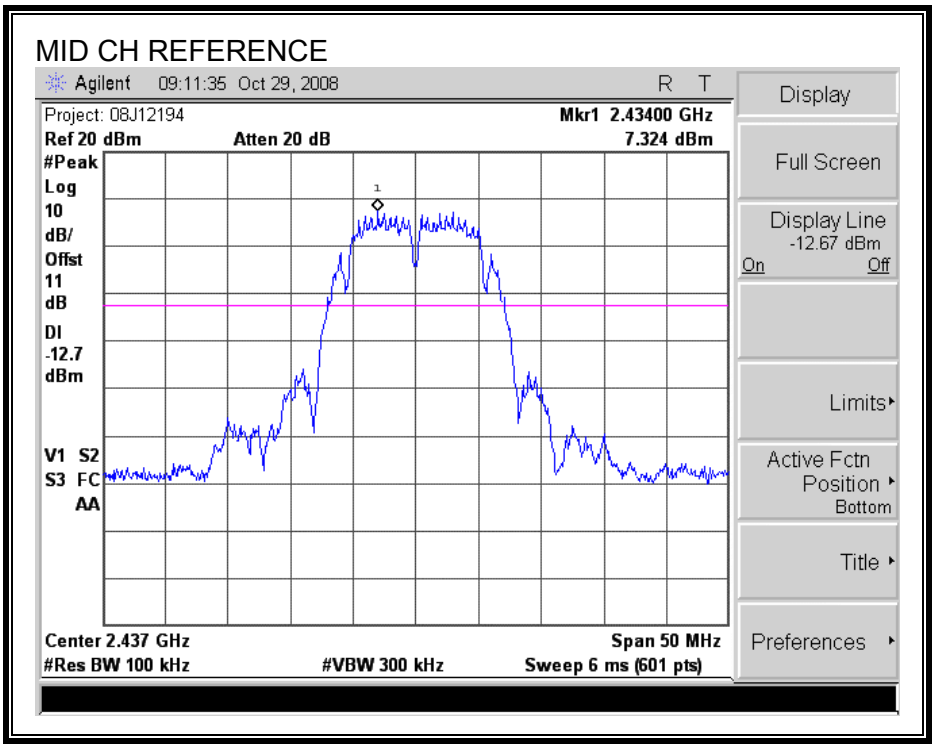
SPURIOUS EMISSIONS, LOW CHANNEL



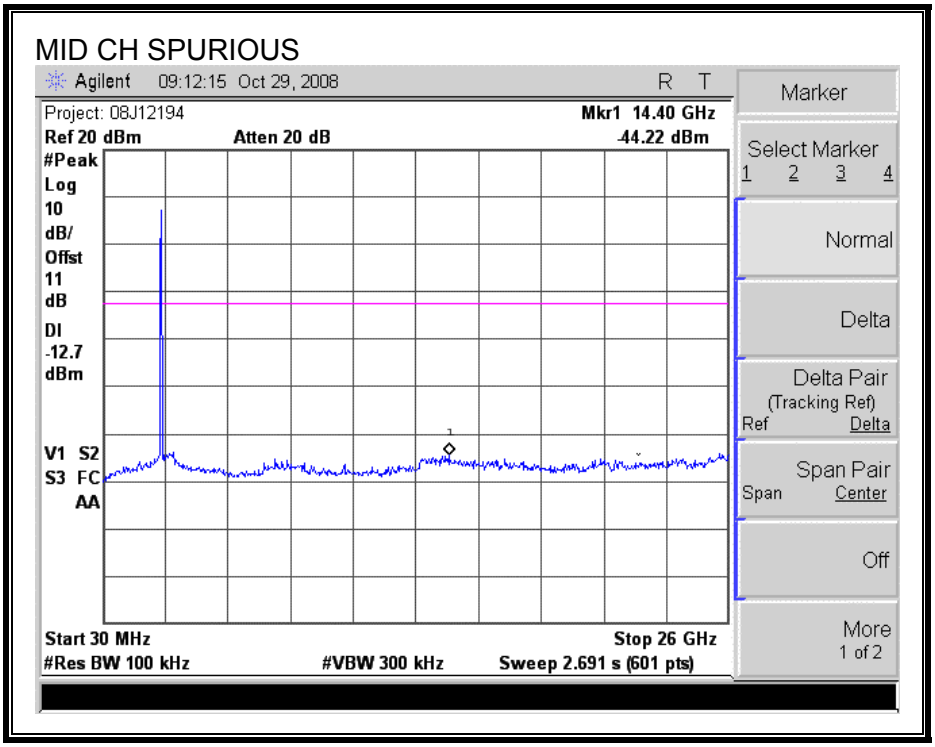
LOW CH SPURIOUS



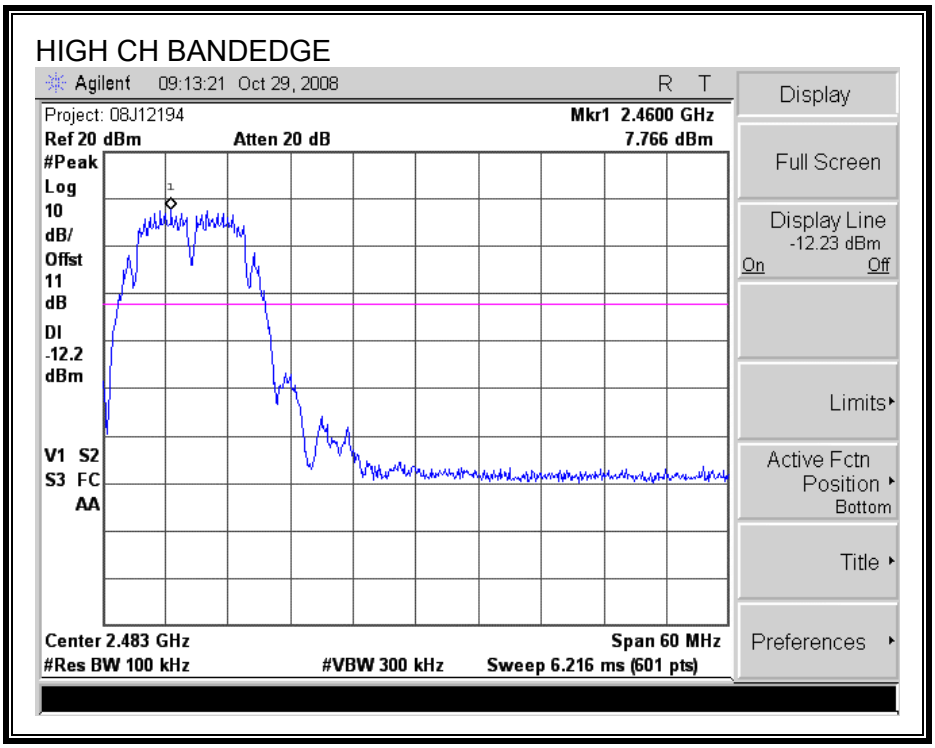
SPURIOUS EMISSIONS, MID CHANNEL



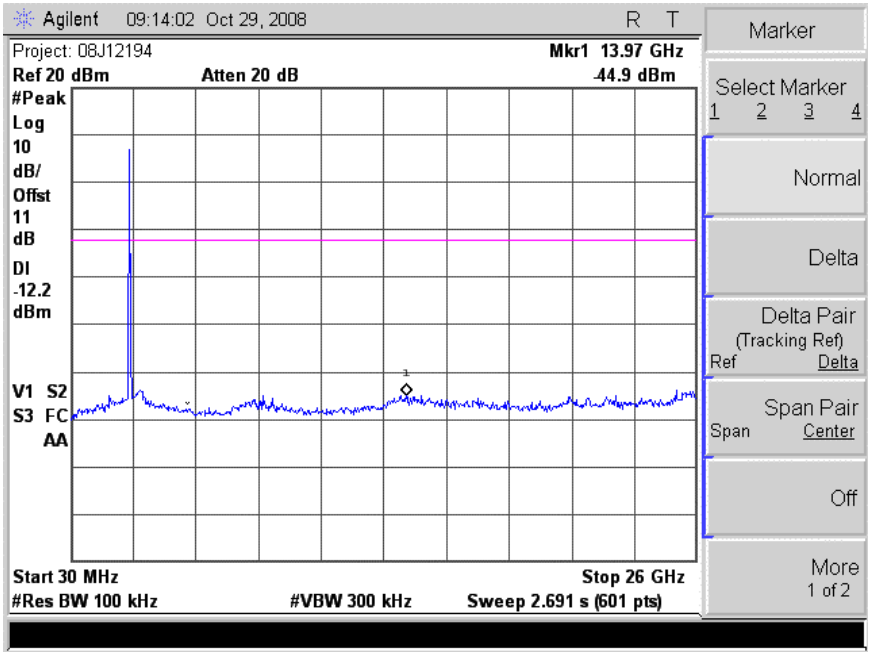
MID CH SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



6.2. 802.11g MODE IN THE 2.4 GHz BAND

6.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

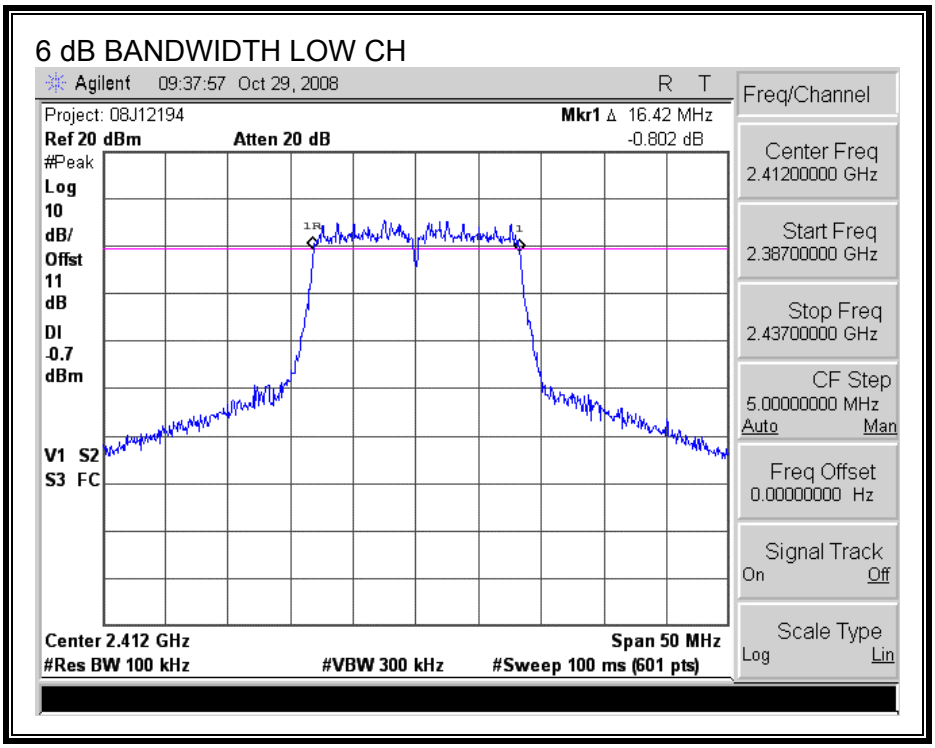
TEST PROCEDURE

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

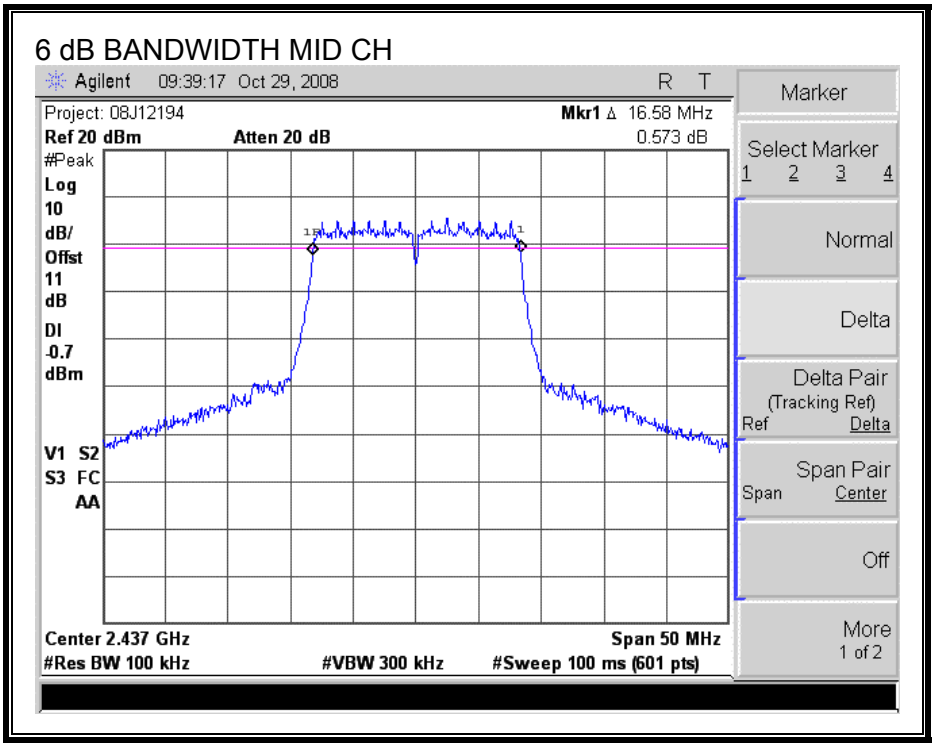
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.42	0.5
Middle	2437	16.58	0.5
High	2462	16.5	0.5

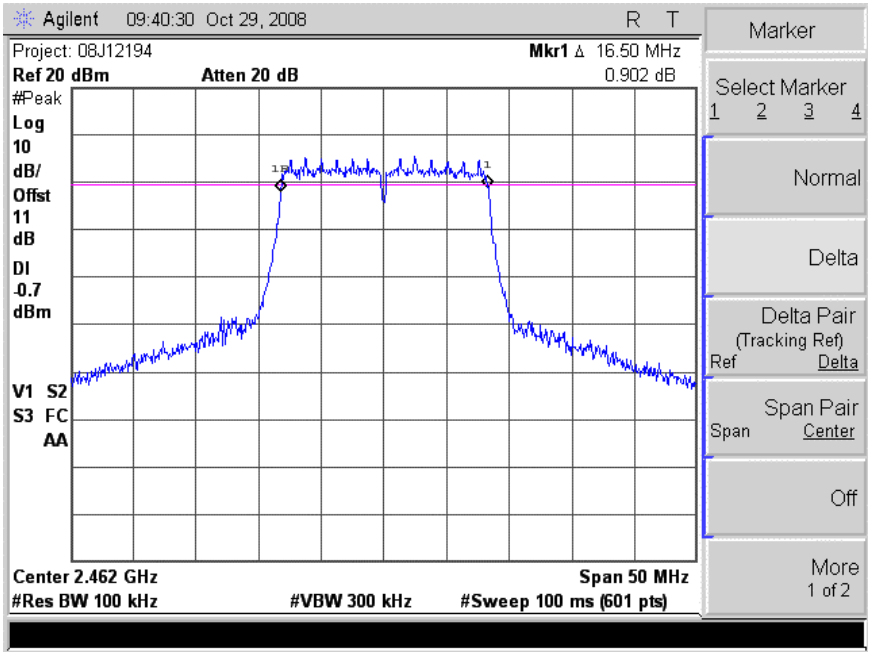
6 dB BANDWIDTH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



6.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

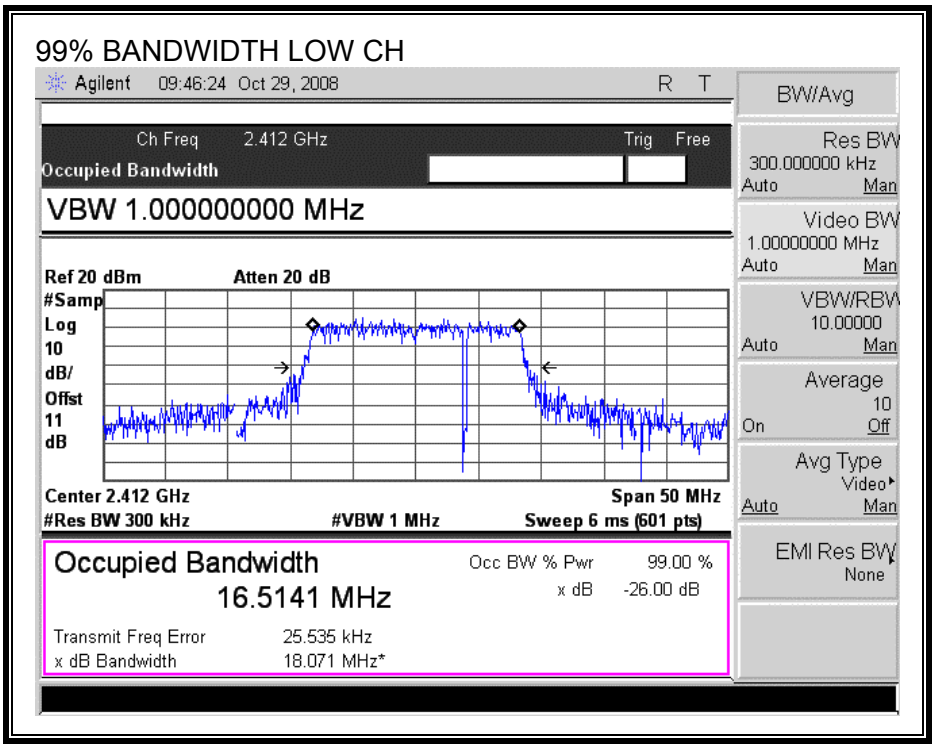
TEST PROCEDURE

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

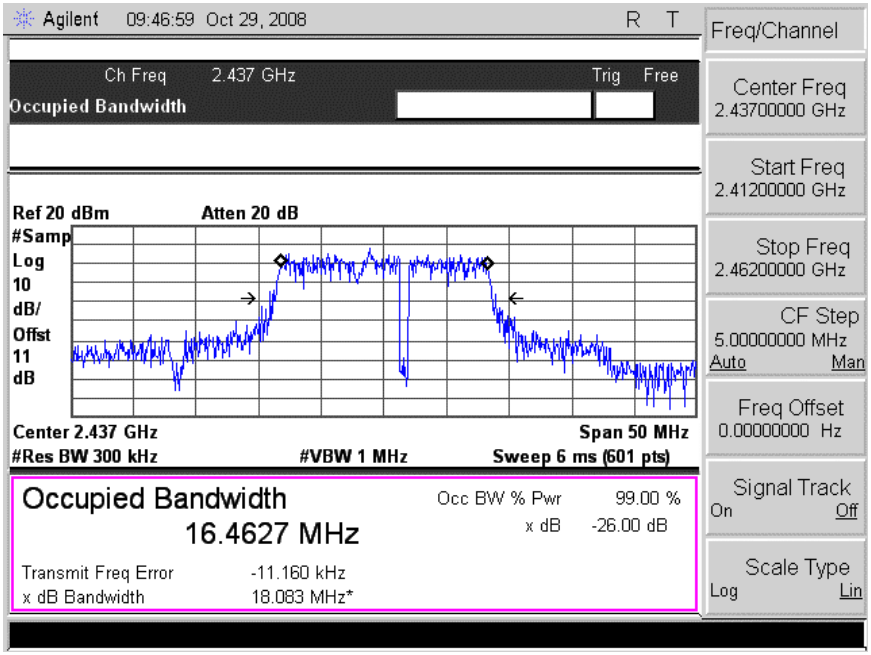
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.5141
Middle	2437	16.4627
High	2462	16.5358

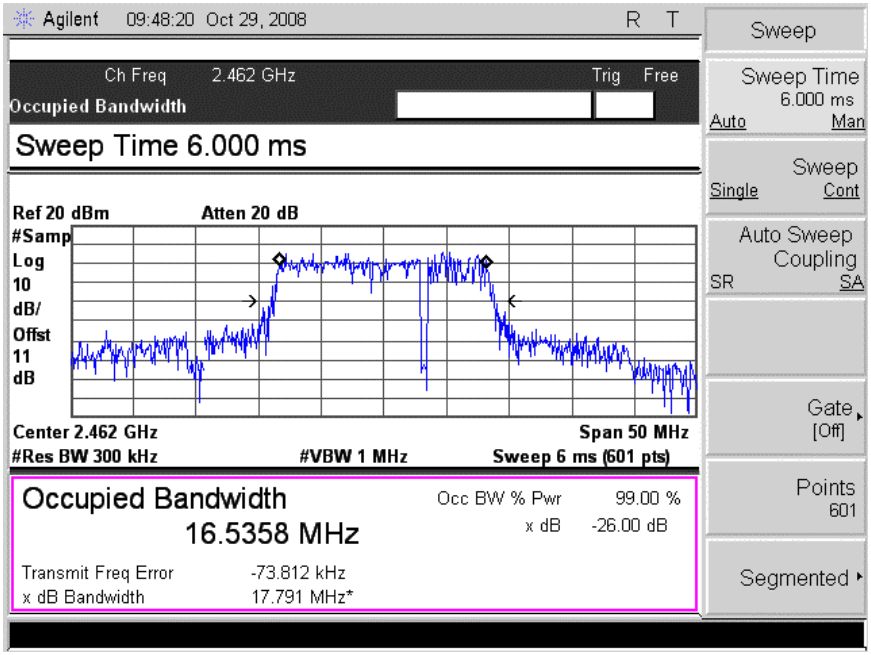
99% BANDWIDTH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



6.2.3. 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 11dB (including 10 dB pad and 1dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	15.50
Middle	2437	15.45
High	2462	15.43

6.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

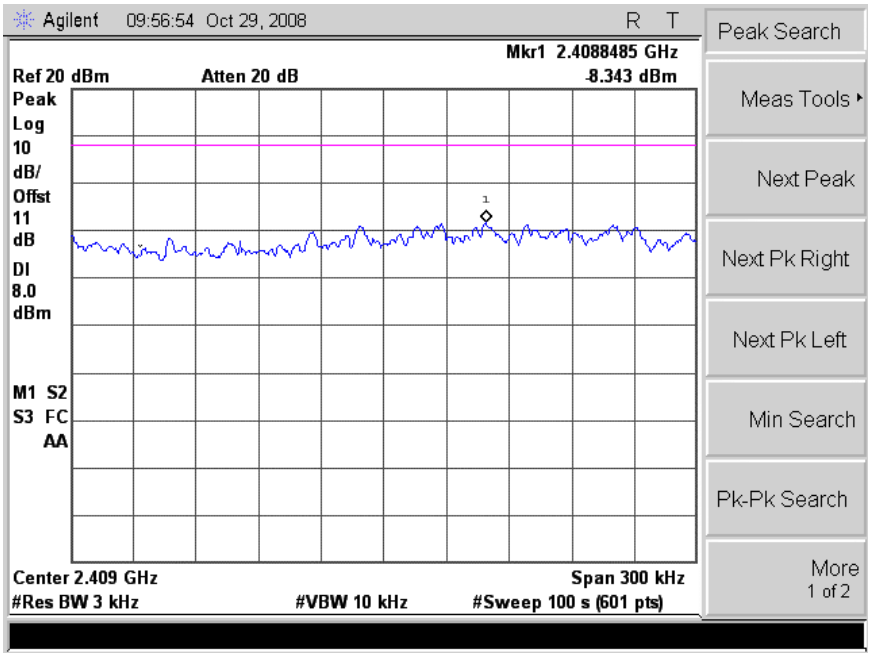
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

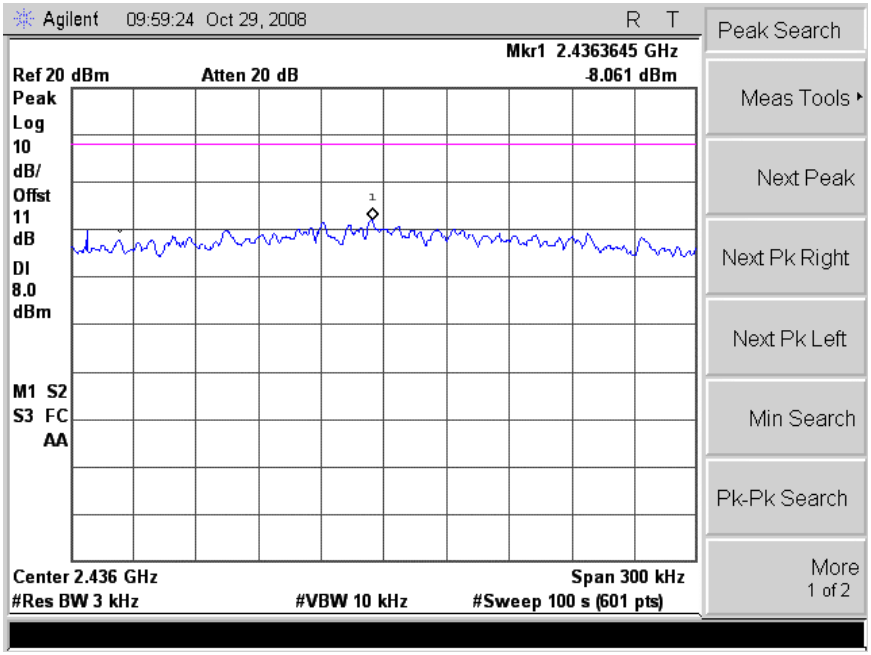
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.34	8	-16.34
Middle	2437	-8.06	8	-16.06
High	2462	-7.57	8	-15.57

POWER SPECTRAL DENSITY

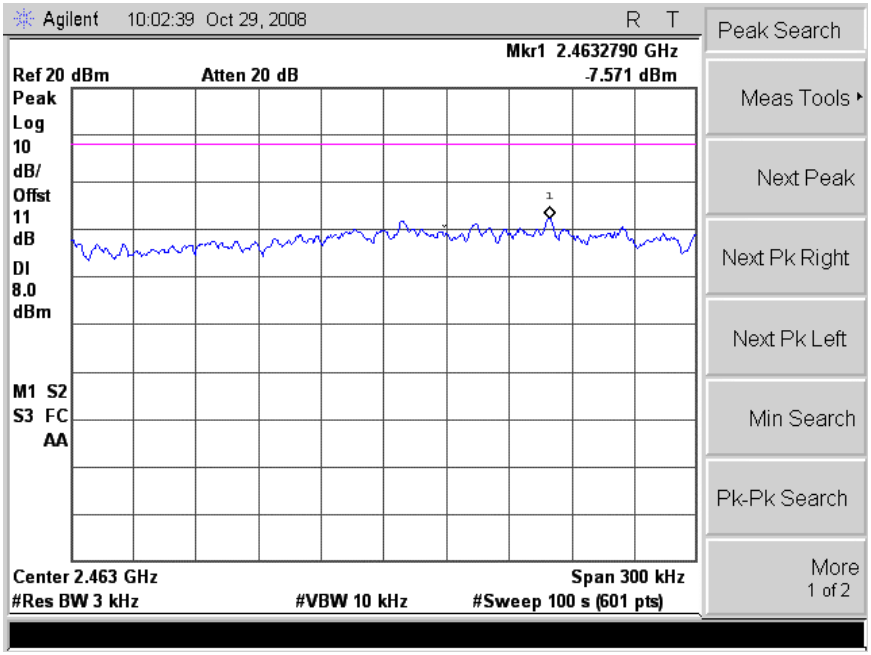
PSD LOW CH



PSD MID CH



PSD HIGH CH



6.2.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

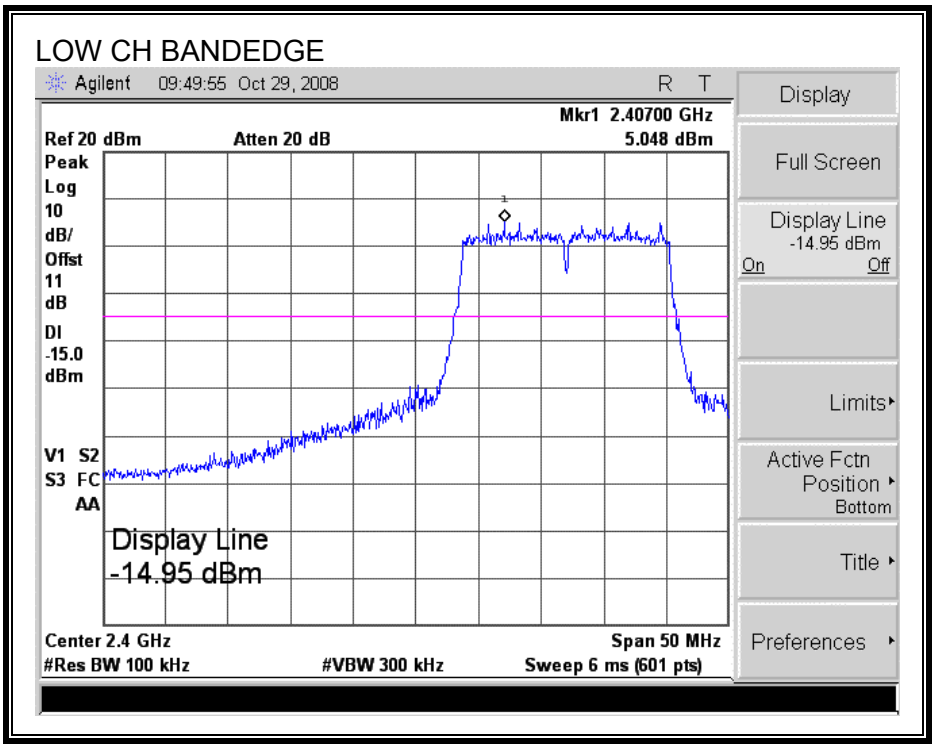
TEST PROCEDURE

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

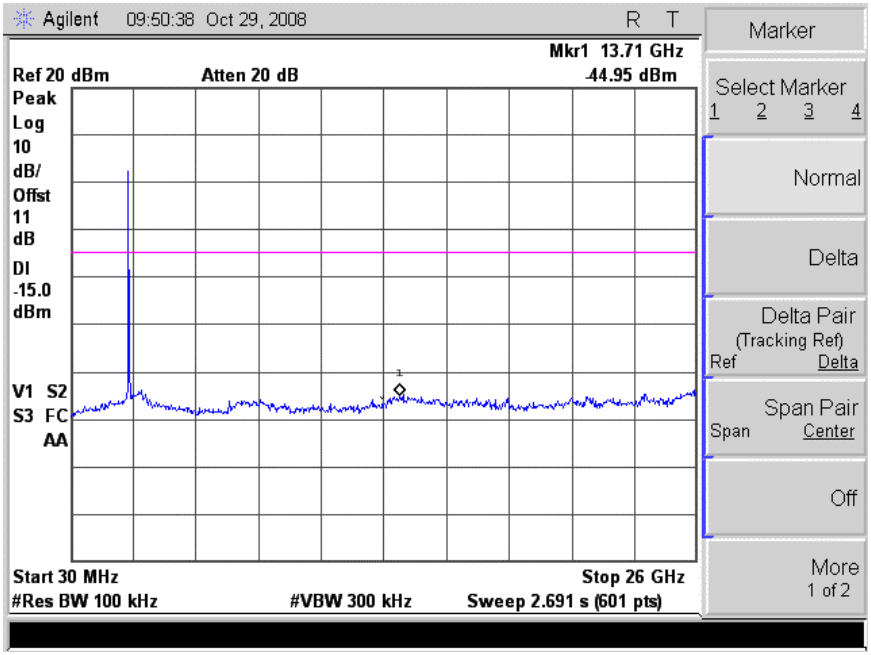
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

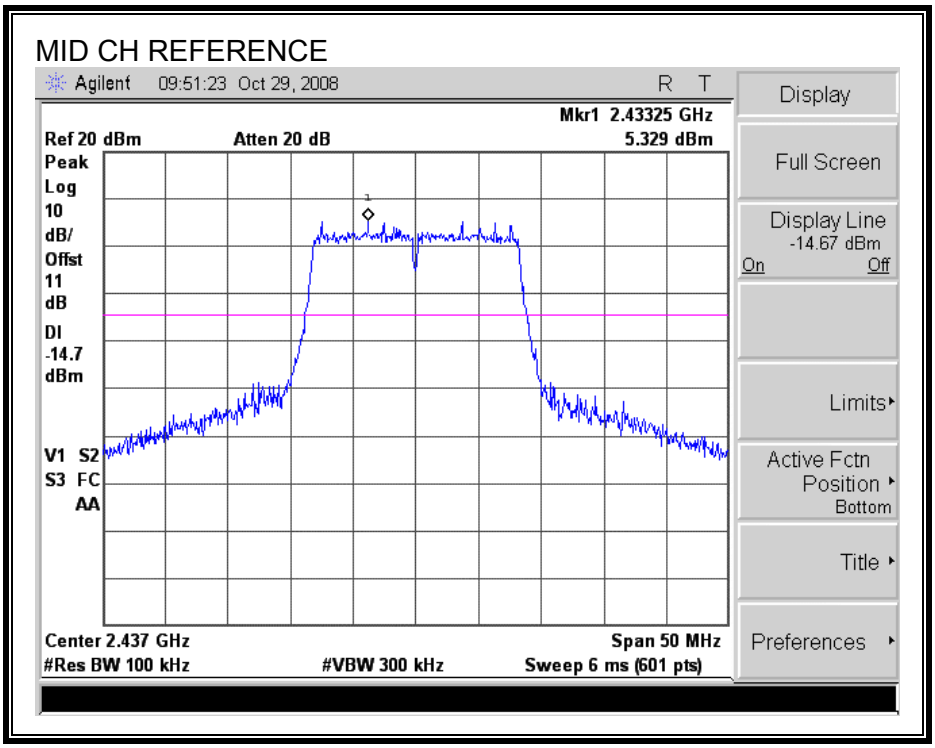
SPURIOUS EMISSIONS, LOW CHANNEL



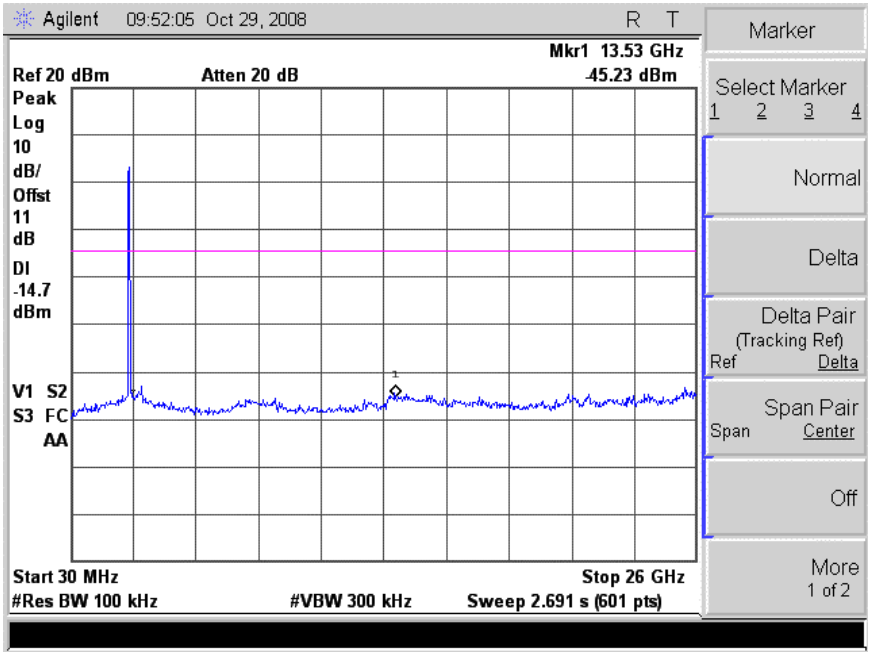
LOW CH SPURIOUS



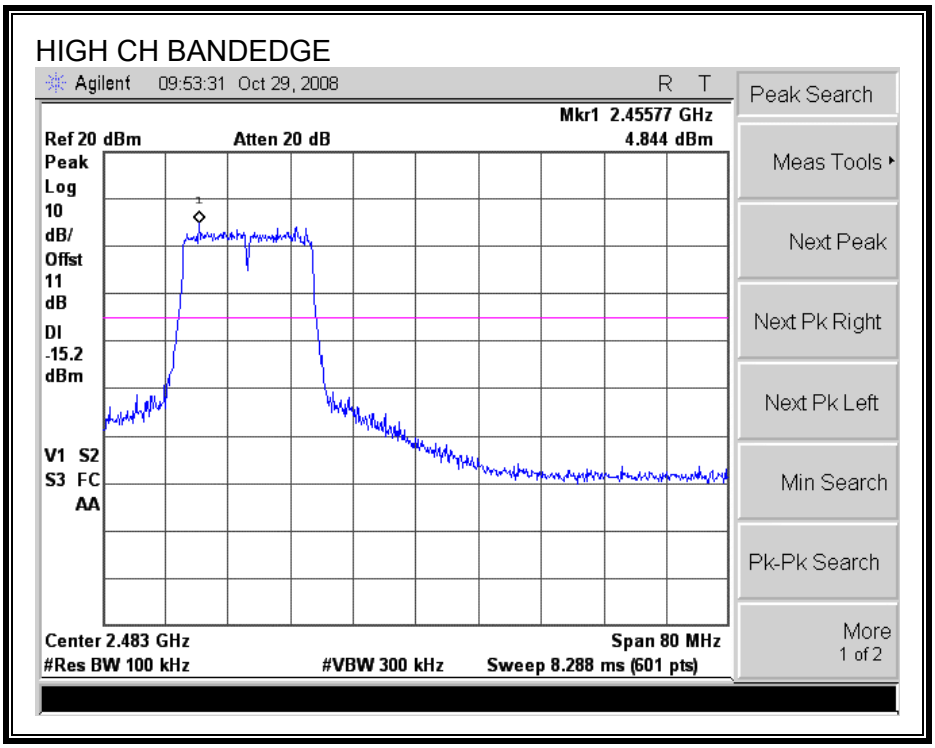
SPURIOUS EMISSIONS, MID CHANNEL



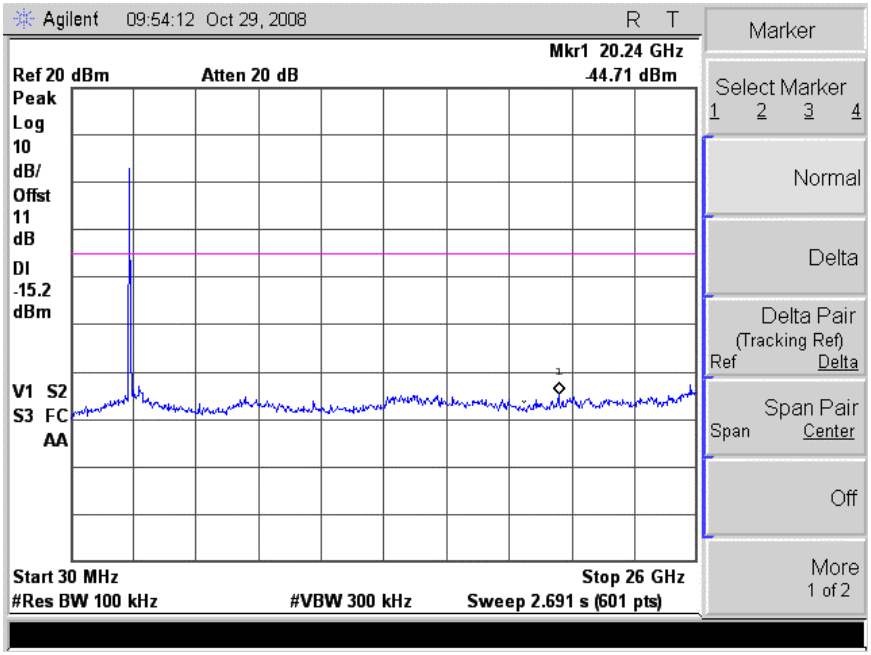
MID CH SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

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

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

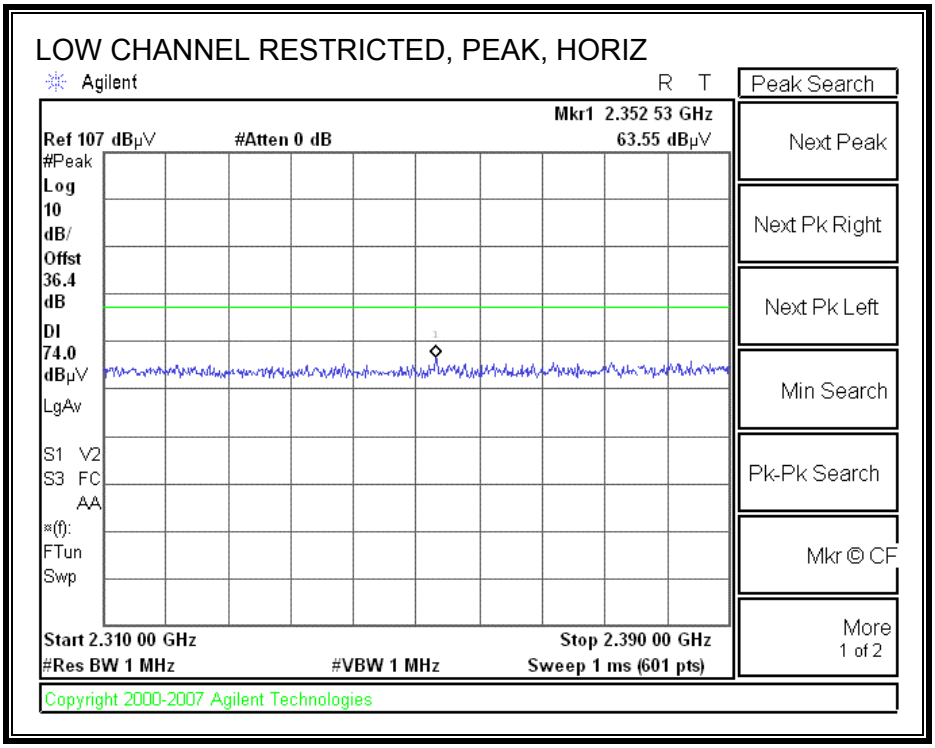
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

7.2. TRANSMITTER ABOVE 1 GHz

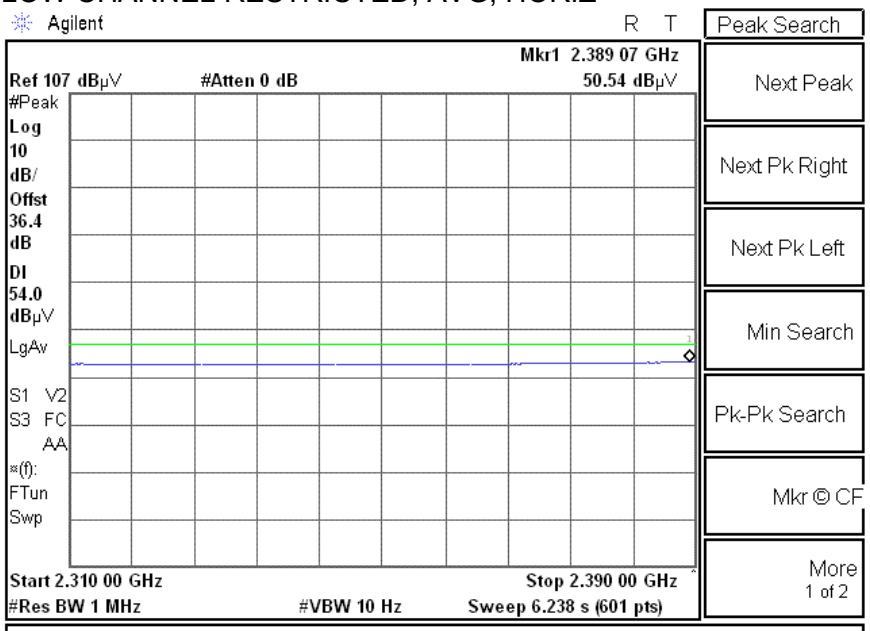
7.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

CONFIGURATION #1: SLEEVE ANTENNA TRANSMITTING

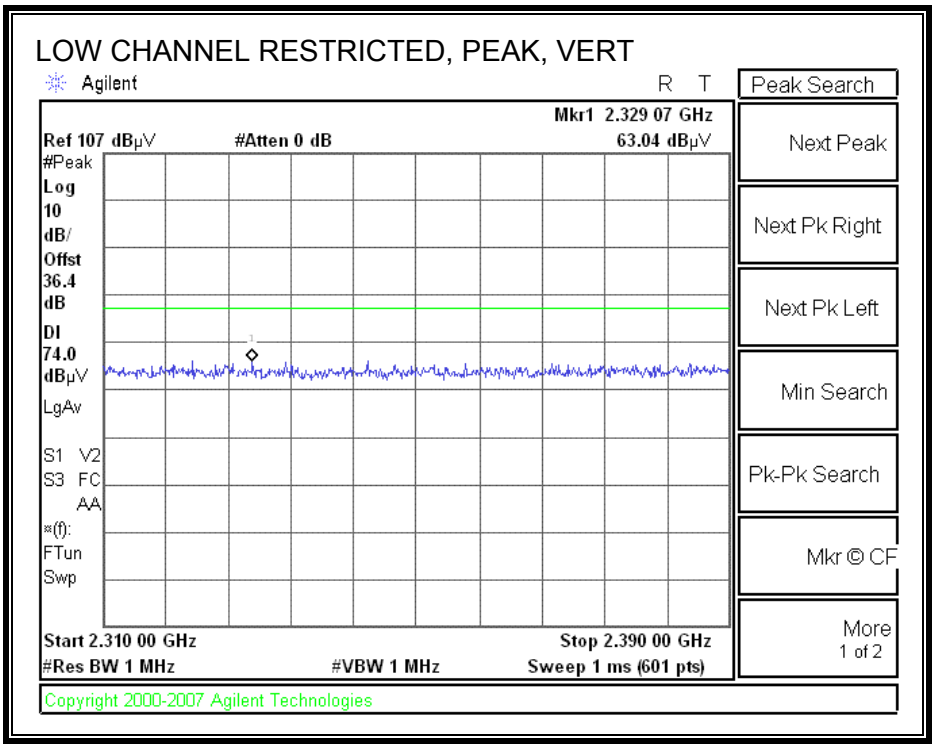
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



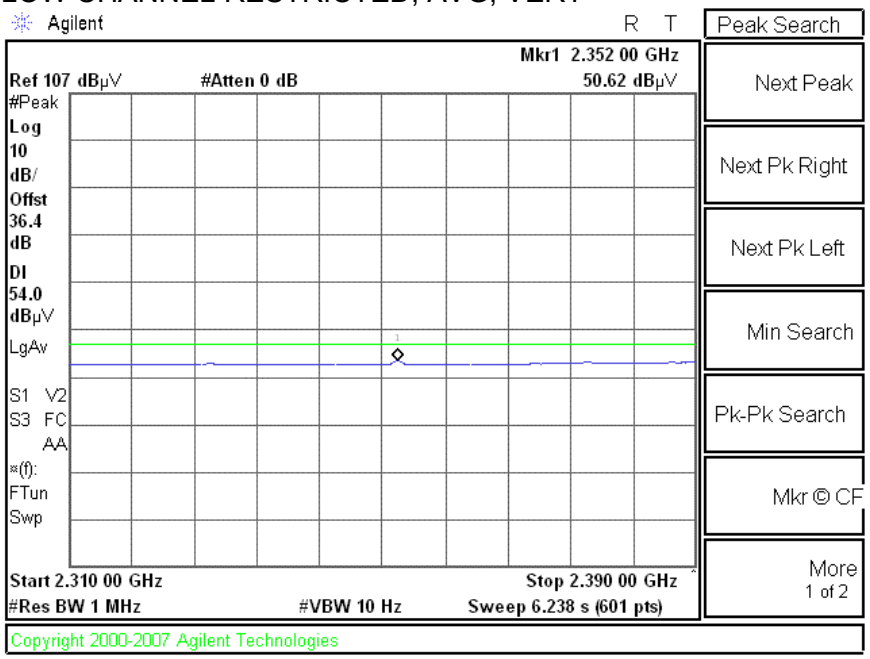
LOW CHANNEL RESTRICTED, AVG, HORIZ



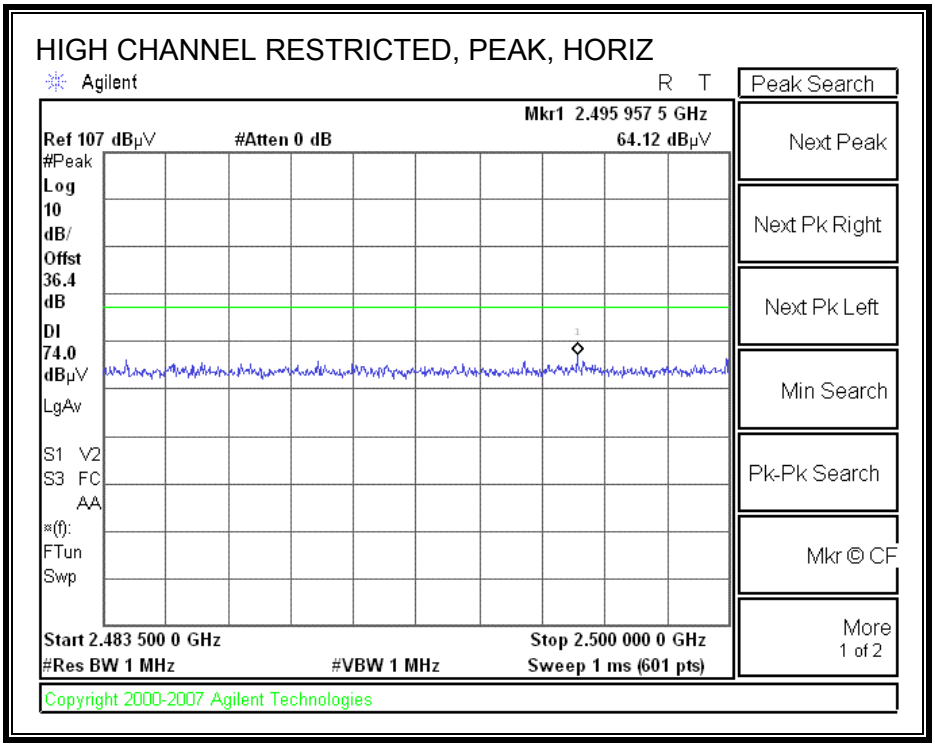
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

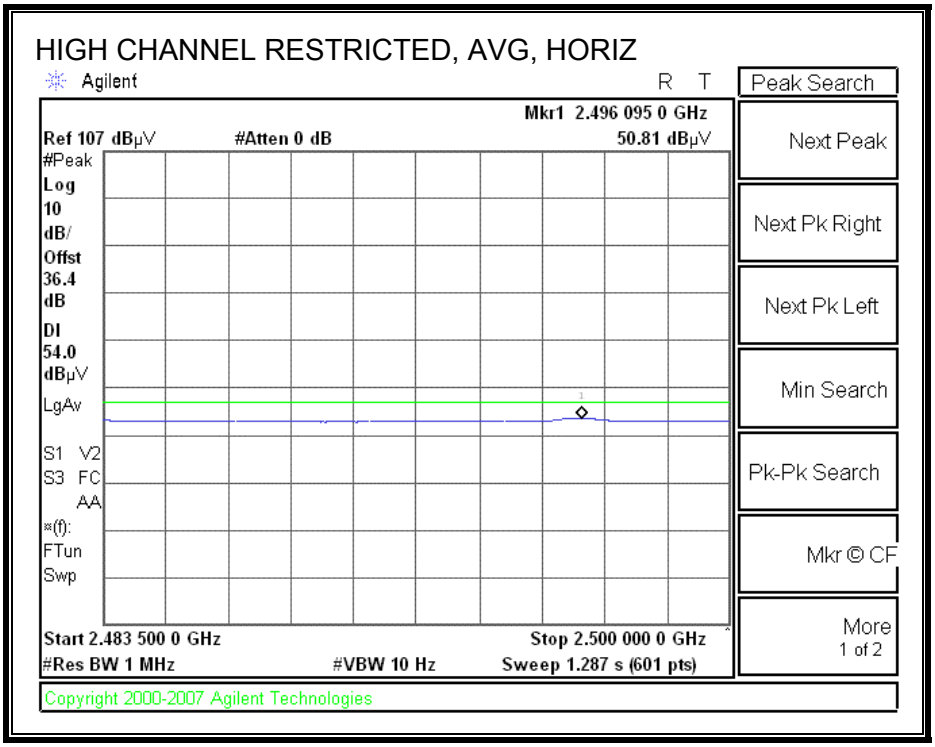


LOW CHANNEL RESTRICTED, AVG, VERT

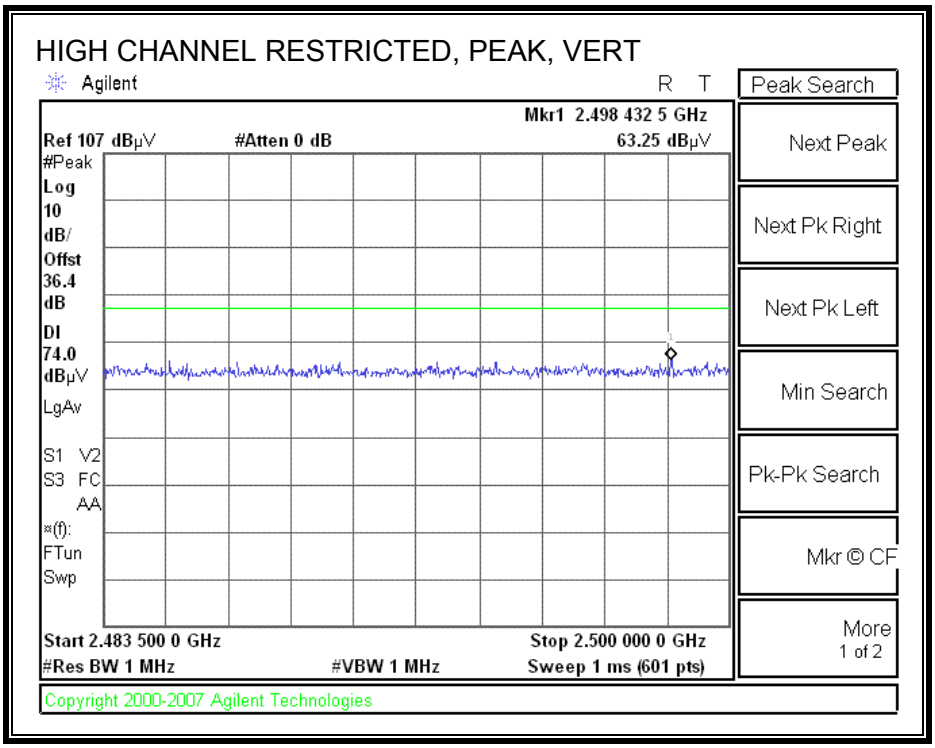


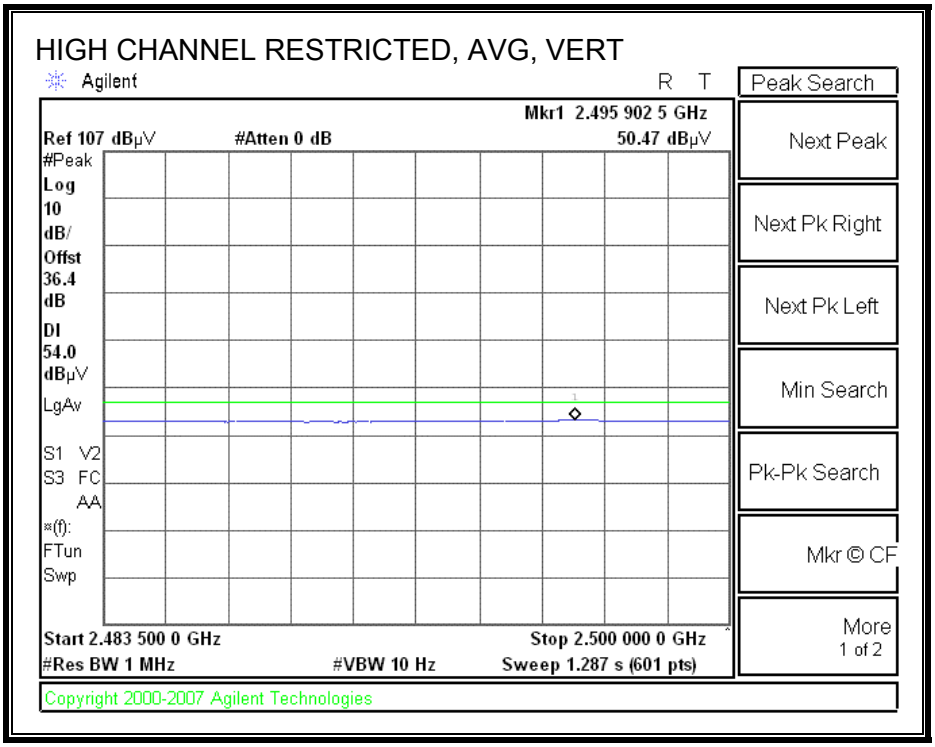
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/25/2008
Test Engineer: Chin Pang
Configuration #1: EUT/Dipole and Sleeve Antenna with Sleeve antenna transmit
Mode: TX, b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

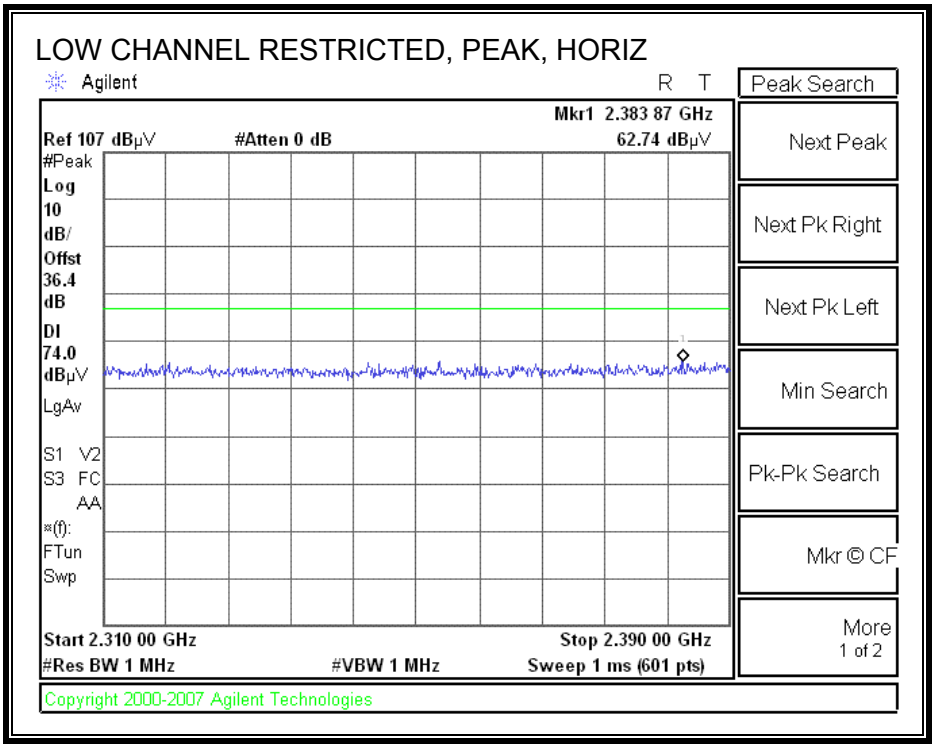
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	40.0	29.5	33.6	7.1	-34.8	0.0	0.0	45.8	35.3	74	54	-28.2	-18.7	V
4.824	3.0	41.6	30.5	33.6	7.1	-34.8	0.0	0.0	47.4	36.3	74	54	-26.6	-17.7	H
Mid Ch, 2437MHz															
4.874	3.0	39.8	29.4	33.6	7.2	-34.9	0.0	0.0	45.7	35.3	74	54	-28.3	-18.7	V
7.311	3.0	41.3	29.0	34.6	8.6	-34.7	0.0	0.0	49.9	37.6	74	54	-24.1	-16.4	V
4.874	3.0	40.8	30.0	33.6	7.2	-34.9	0.0	0.0	46.7	35.9	74	54	-27.3	-18.1	H
7.311	3.0	41.0	29.0	34.6	8.6	-34.7	0.0	0.0	49.6	37.6	74	54	-24.4	-16.4	H
High Ch, 2462MHz															
4.924	3.0	40.5	29.6	33.7	7.2	-34.9	0.0	0.0	46.5	35.6	74	54	-27.5	-18.4	V
7.386	3.0	41.8	29.3	34.6	8.7	-34.6	0.0	0.0	50.4	37.9	74	54	-23.6	-16.1	V
4.924	3.0	41.0	30.6	33.7	7.2	-34.9	0.0	0.0	47.0	36.6	74	54	-27.0	-17.4	H
7.386	3.0	40.8	28.8	34.6	8.7	-34.6	0.0	0.0	49.4	37.4	74	54	-24.6	-16.6	H

Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

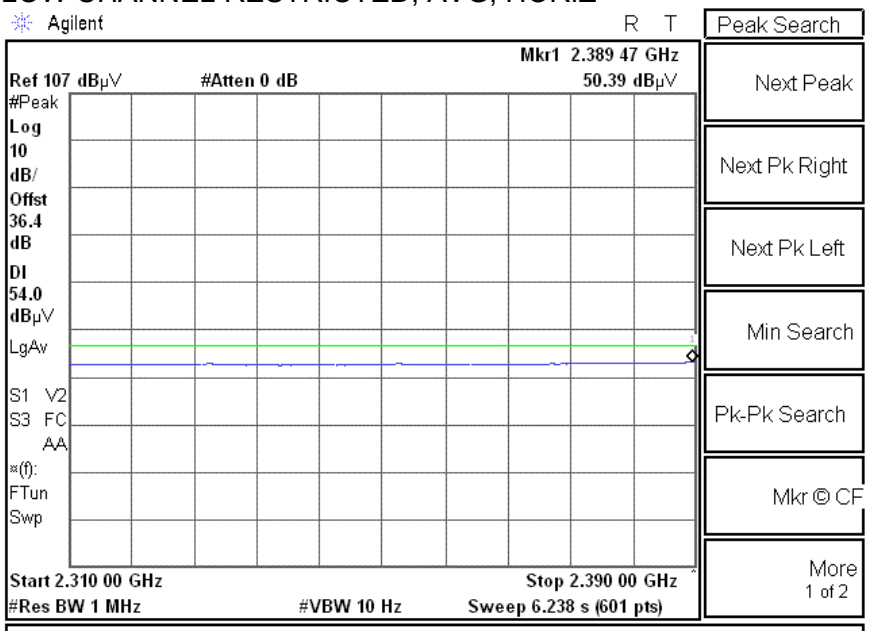
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

CONFIGURTION #2: DIPOLE ANTENNA TRANSMITTING

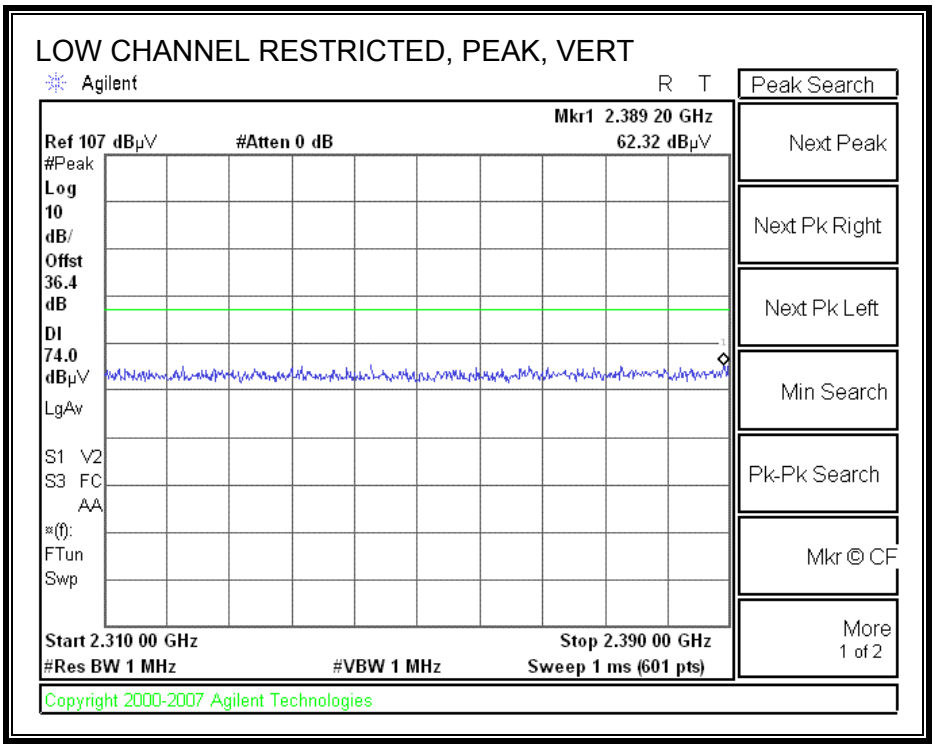
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



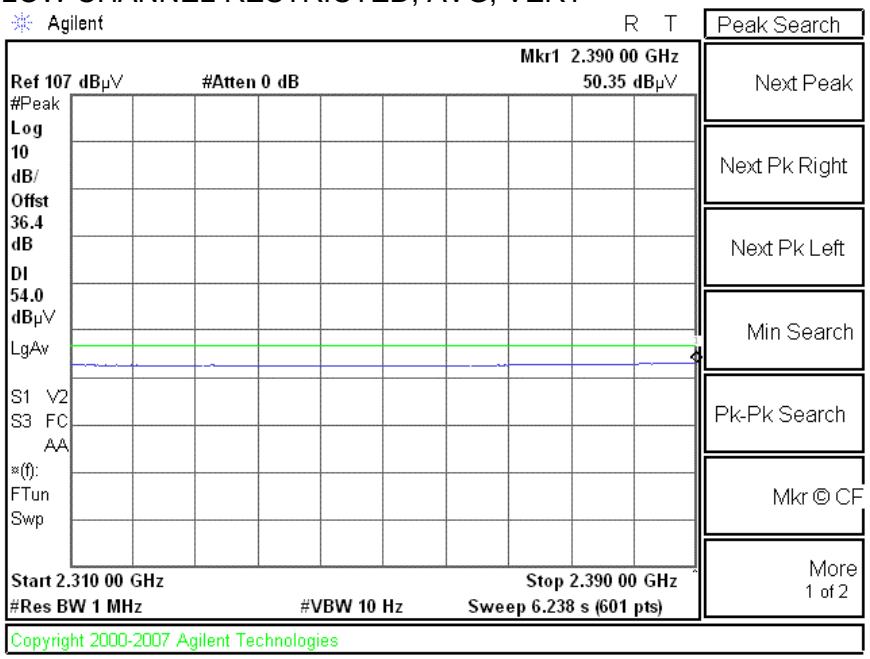
LOW CHANNEL RESTRICTED, AVG, HORIZ



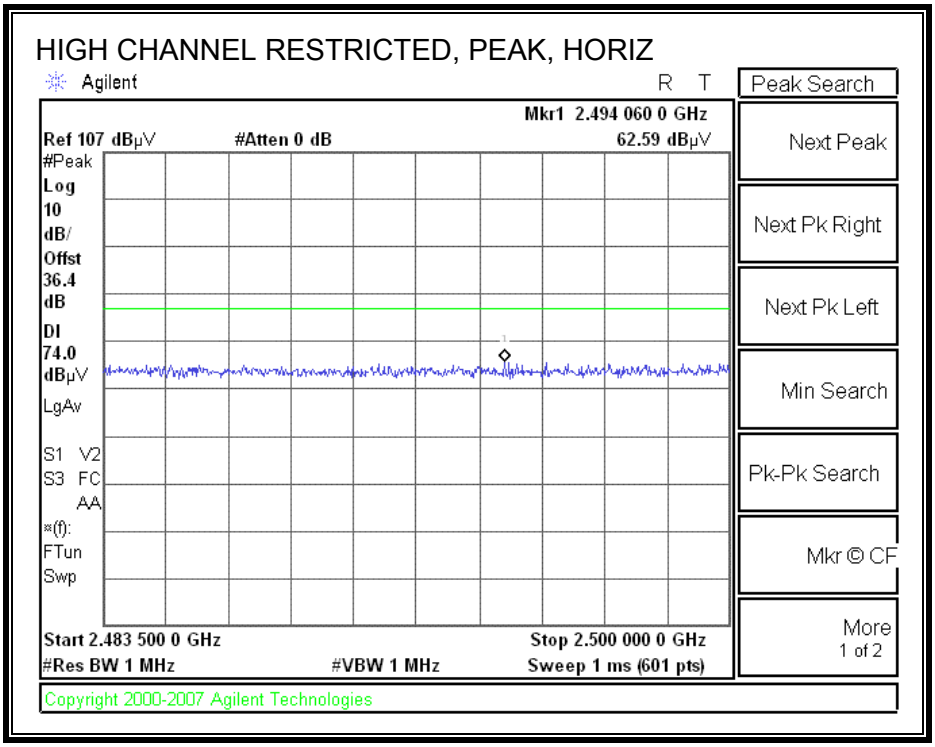
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



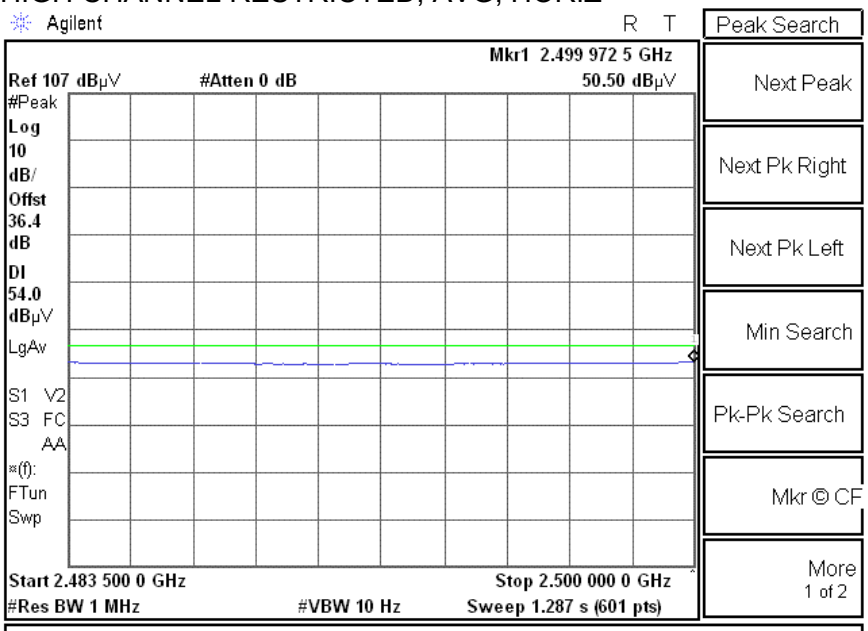
LOW CHANNEL RESTRICTED, AVG, VERT



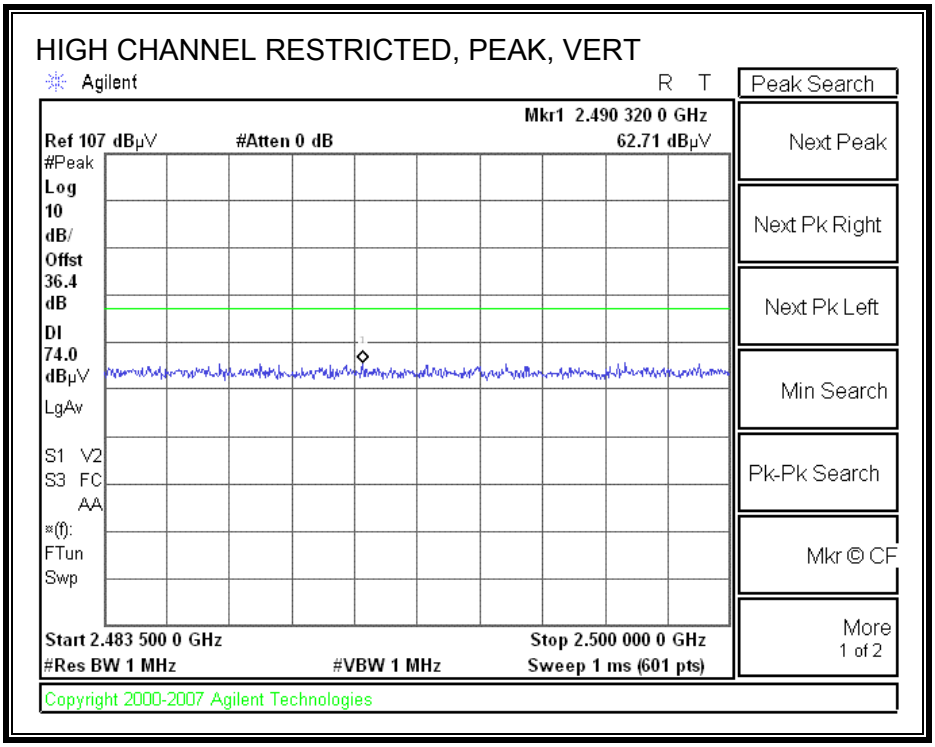
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



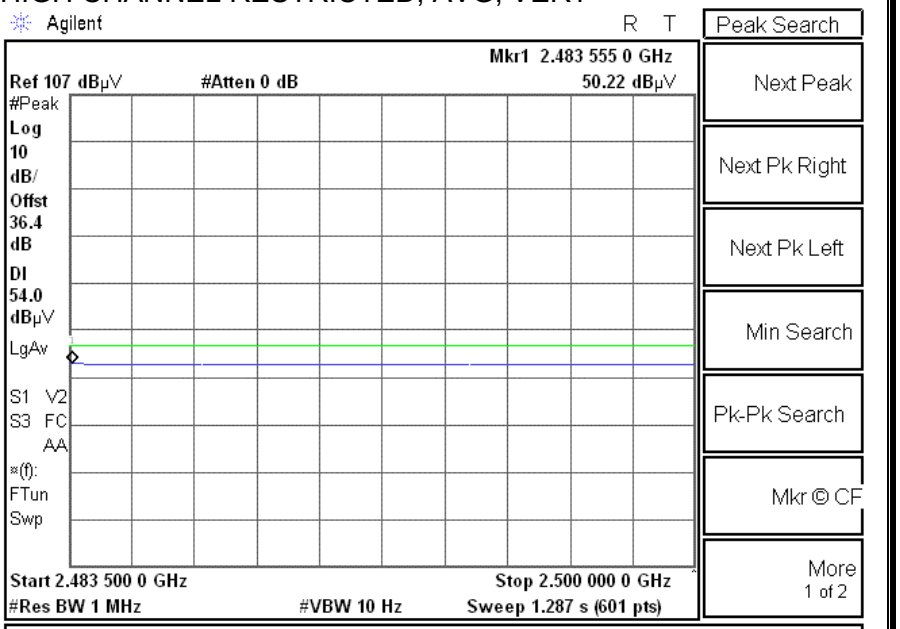
HIGH CHANNEL RESTRICTED, AVG, HORIZ



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/25/2008
Test Engineer: Chin Pang
Configuration #2: EUT / Sleeve and Dipole Antenna with Dipole antenna transmitting
Mode: TX, b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

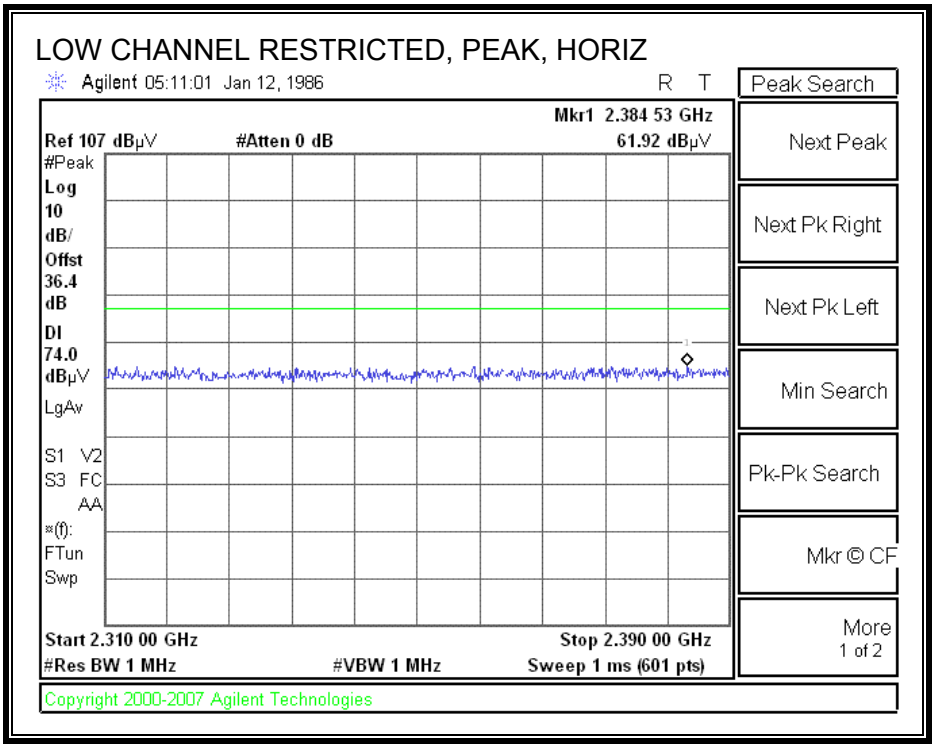
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	41.0	29.5	33.6	7.1	-34.8	0.0	0.0	46.8	35.3	74	54	-27.2	-18.7	V
4.824	3.0	40.0	28.3	33.6	7.1	-34.8	0.0	0.0	45.8	34.1	74	54	-28.2	-19.9	H
Mid Ch, 2437MHz															
4.874	3.0	41.8	30.0	33.6	7.2	-34.9	0.0	0.0	47.7	35.9	74	54	-26.3	-18.1	V
7.311	3.0	41.5	28.2	34.6	8.6	-34.7	0.0	0.0	50.1	36.8	74	54	-23.9	-17.2	V
4.874	3.0	40.8	28.2	33.6	7.2	-34.9	0.0	0.0	46.7	34.1	74	54	-27.3	-19.9	H
7.311	3.0	41.6	29.0	34.6	8.6	-34.7	0.0	0.0	50.2	37.6	74	54	-23.8	-16.4	H
High Ch, 2462MHz															
4.924	3.0	42.5	33.0	33.7	7.2	-34.9	0.0	0.0	48.5	39.0	74	54	-25.5	-15.0	V
7.386	3.0	41.7	28.4	34.6	8.7	-34.6	0.0	0.0	50.3	37.0	74	54	-23.7	-17.0	V
4.924	3.0	41.5	29.0	33.7	7.2	-34.9	0.0	0.0	47.5	35.0	74	54	-26.5	-19.0	H
7.386	3.0	41.3	29.0	34.6	8.7	-34.6	0.0	0.0	49.9	37.6	74	54	-24.1	-16.4	H

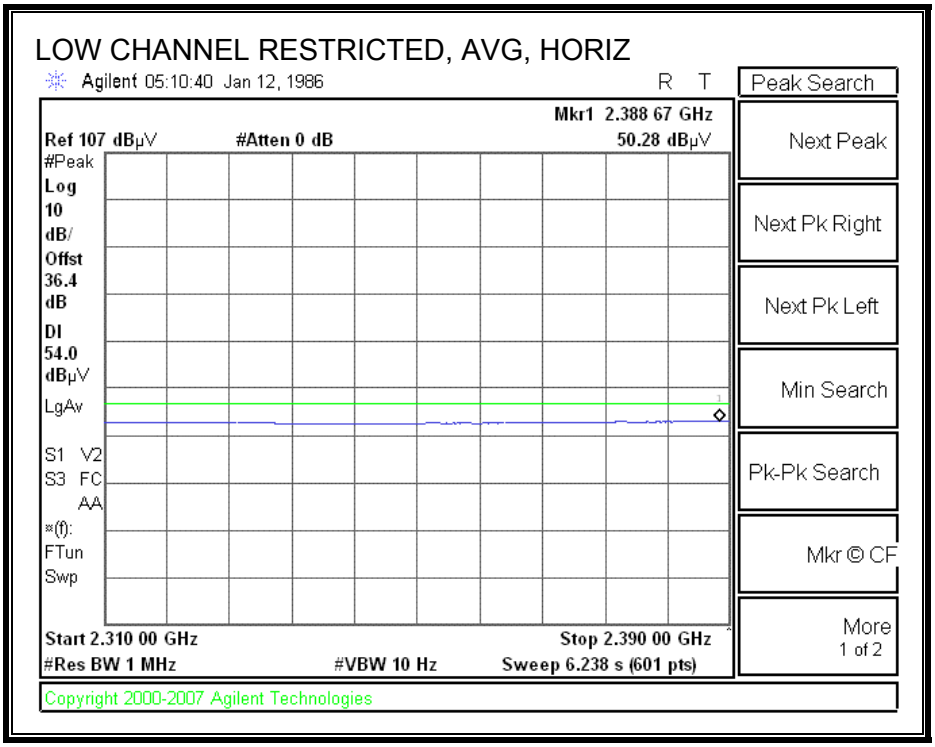
Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

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

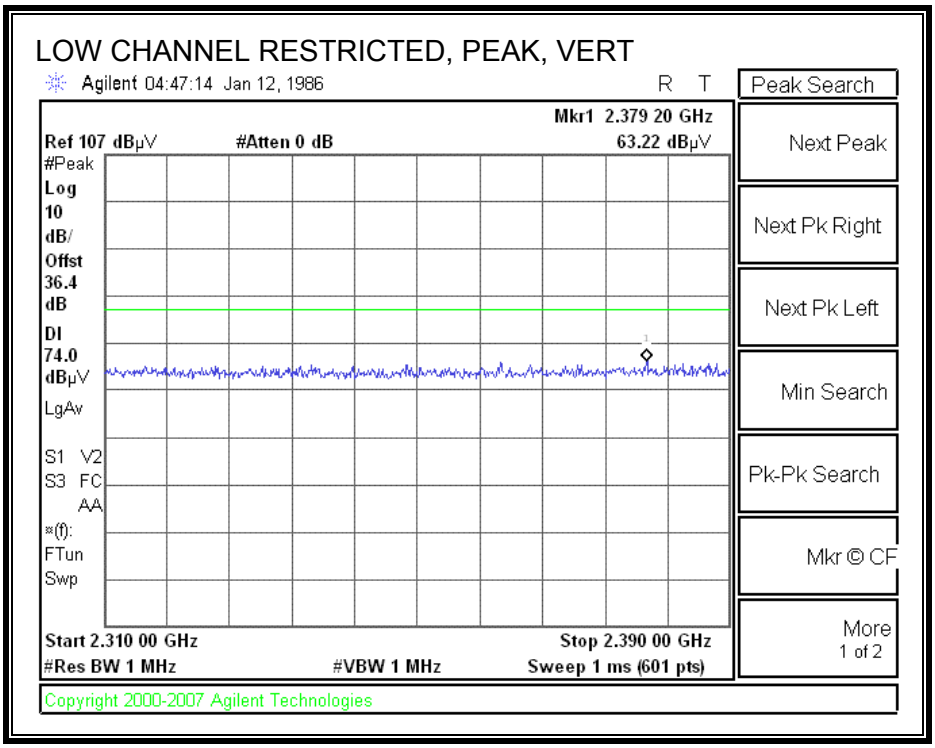
CONFIGURATION #3: PIFA1 ANTENNA TRANSMITTING

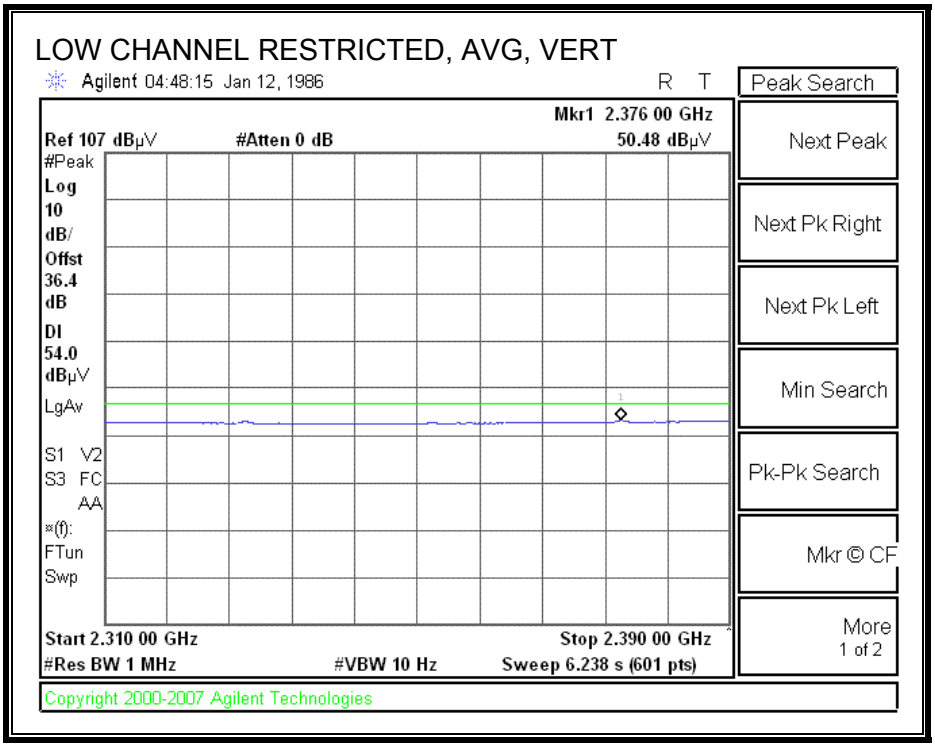
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



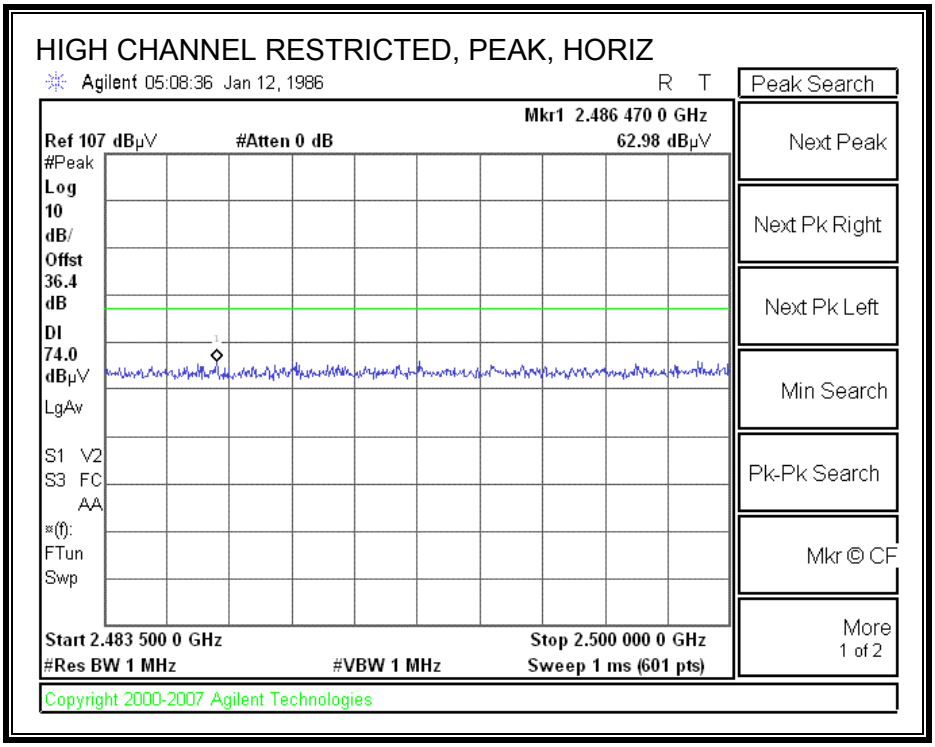


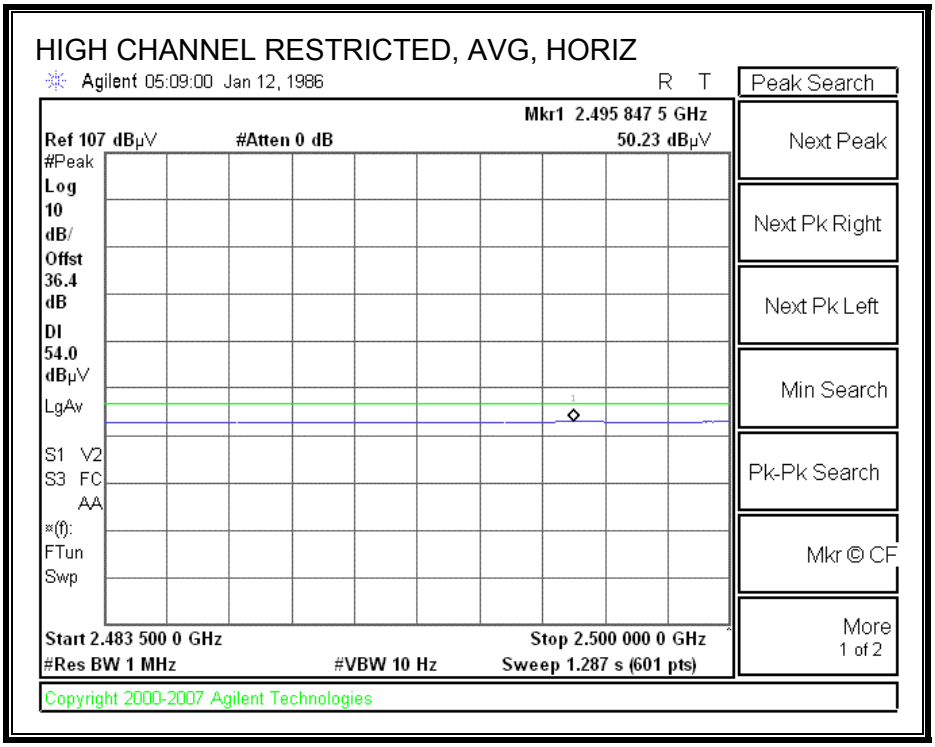
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



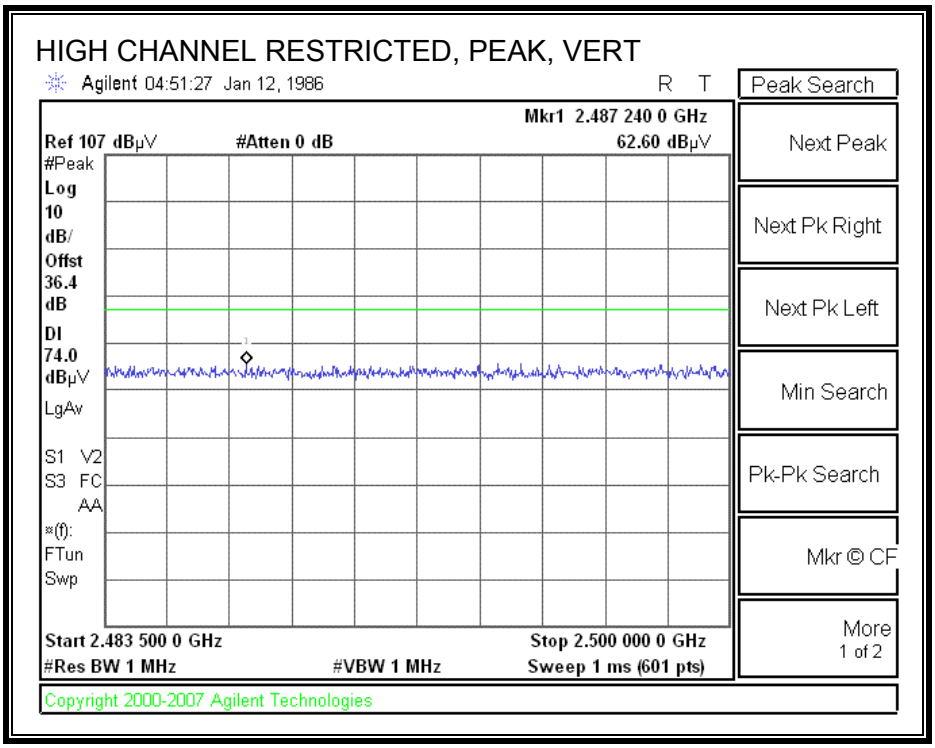


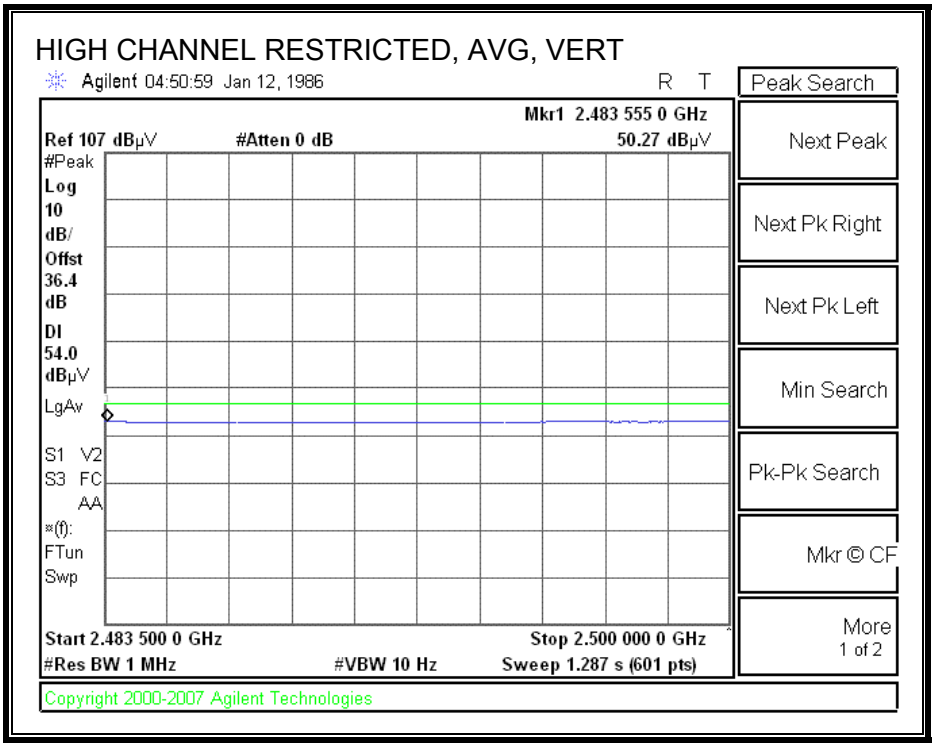
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/28/2008
Test Engineer: Chin Pang
Configuration #3: EUT/PIFA1 and PIFA2 Antenna with PIFA1 Transmitting
Mode: TX, b mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
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	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	40.8	28.2	33.6	7.1	-34.8	0.0	0.0	46.6	34.0	74	54	-27.4	-20.0	V
4.824	3.0	40.4	28.3	33.6	7.1	-34.8	0.0	0.0	46.2	34.1	74	54	-27.8	-19.9	H
Mid Ch, 2437MHz															
4.874	3.0	40.5	27.6	33.6	7.2	-34.9	0.0	0.0	46.4	33.5	74	54	-27.6	-20.5	V
7.311	3.0	41.0	29.0	34.6	8.6	-34.7	0.0	0.0	49.6	37.6	74	54	-24.4	-16.4	V
4.874	3.0	40.5	28.0	33.6	7.2	-34.9	0.0	0.0	46.4	33.9	74	54	-27.6	-20.1	H
7.311	3.0	41.8	29.0	34.6	8.6	-34.7	0.0	0.0	50.4	37.6	74	54	-23.6	-16.4	H
High Ch, 2462MHz															
4.924	3.0	40.6	27.6	33.7	7.2	-34.9	0.0	0.0	46.6	33.6	74	54	-27.4	-20.4	V
7.386	3.0	40.6	28.6	34.6	8.7	-34.6	0.0	0.0	49.2	37.2	74	54	-24.8	-16.8	V
4.924	3.0	41.4	28.0	33.7	7.2	-34.9	0.0	0.0	47.4	34.0	74	54	-26.6	-20.0	H
7.386	3.0	42.0	29.2	34.6	8.7	-34.6	0.0	0.0	50.6	37.8	74	54	-23.4	-16.2	H

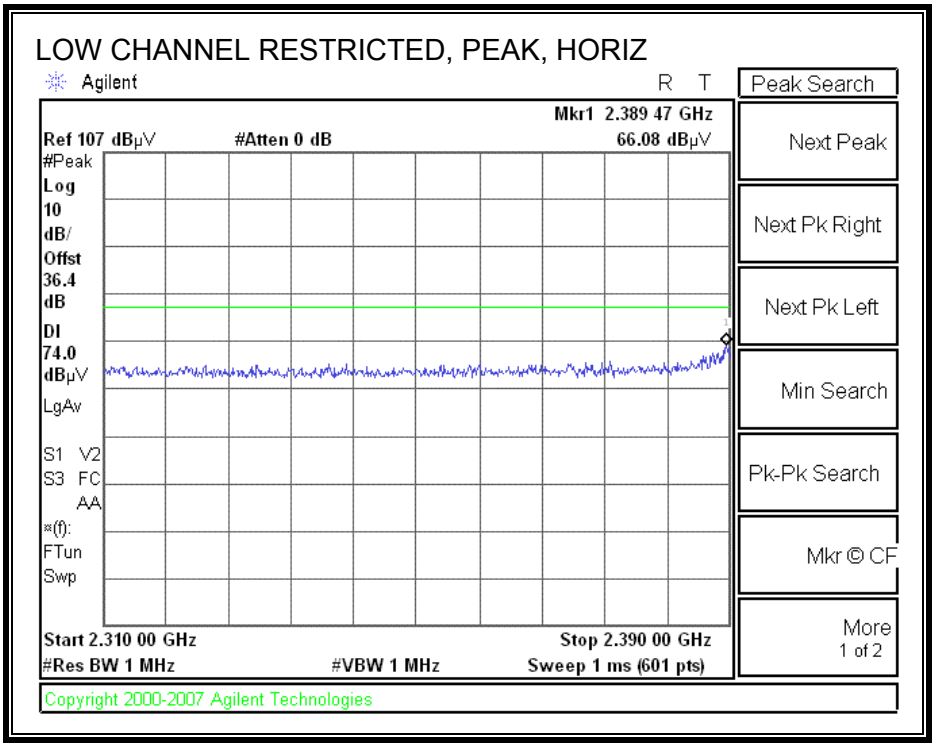
Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

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

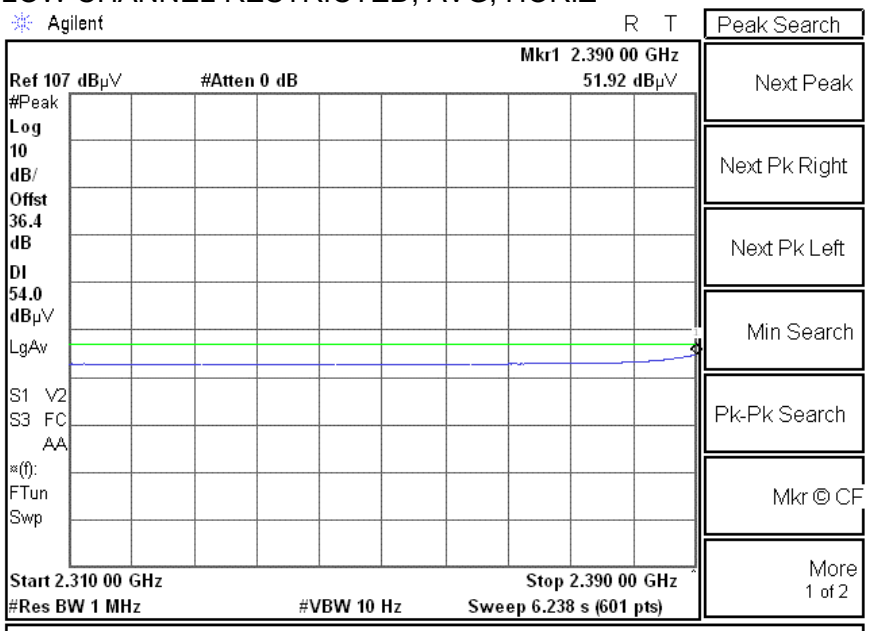
7.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

CONFIGURATION #1: SLEEVE ANTENNA TRANSMITTING

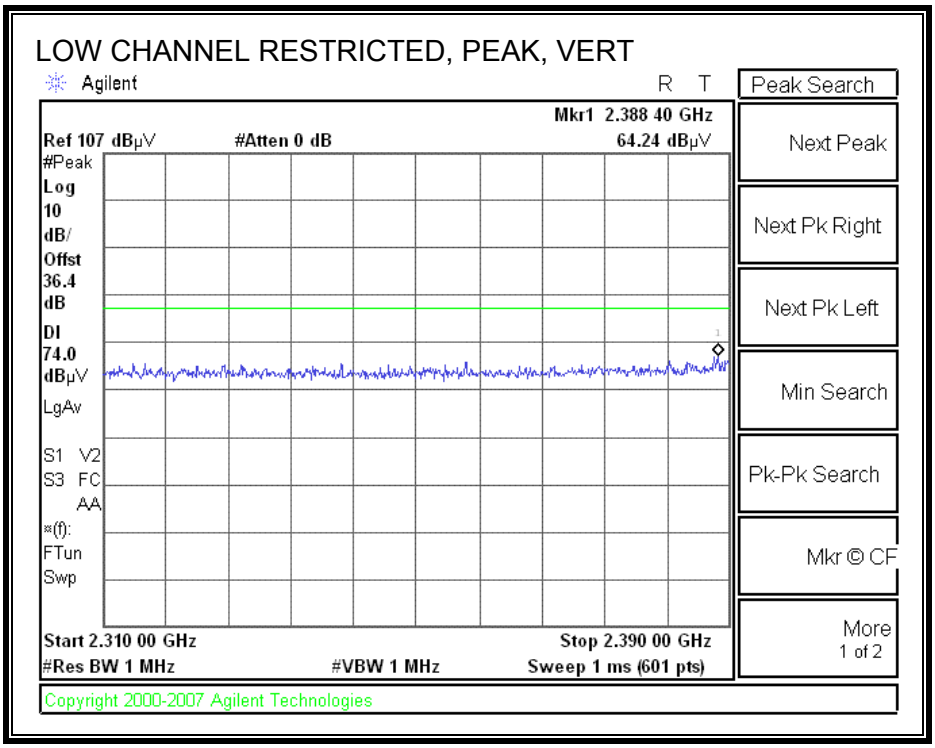
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



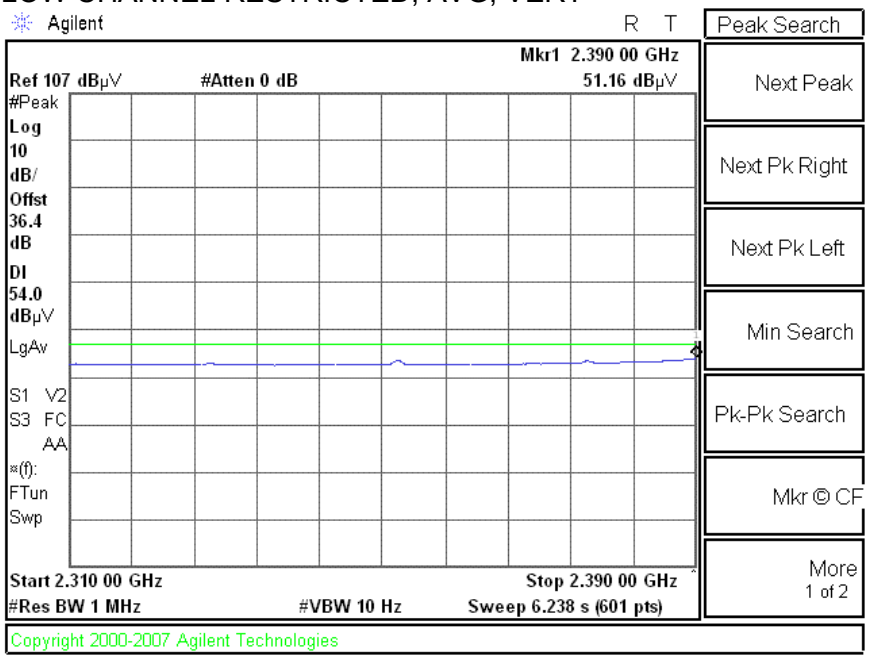
LOW CHANNEL RESTRICTED, AVG, HORIZ



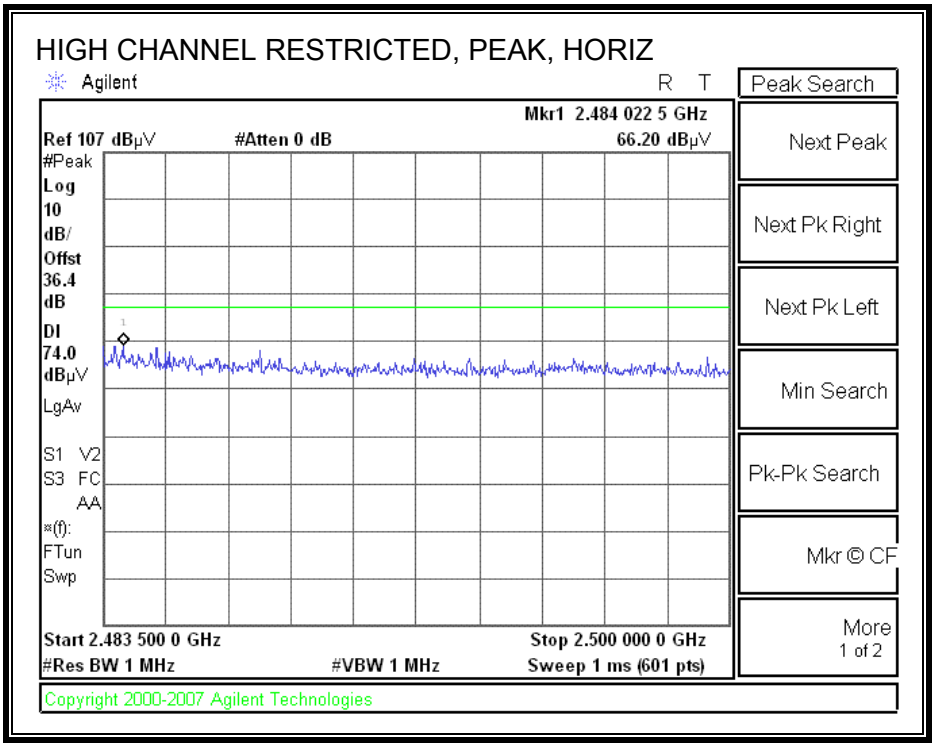
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

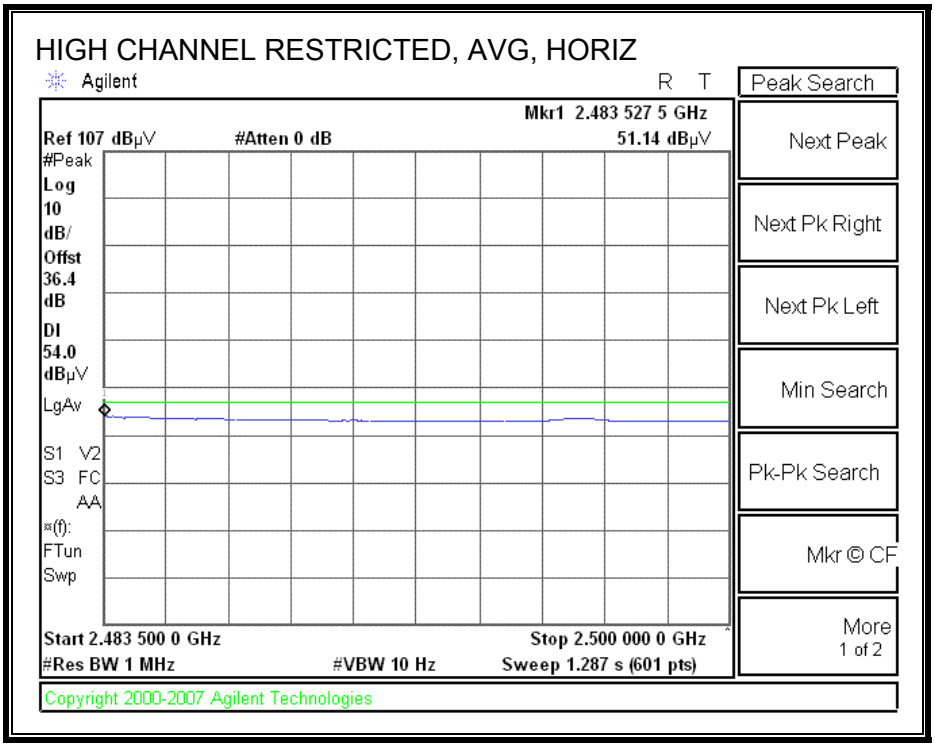


LOW CHANNEL RESTRICTED, AVG, VERT

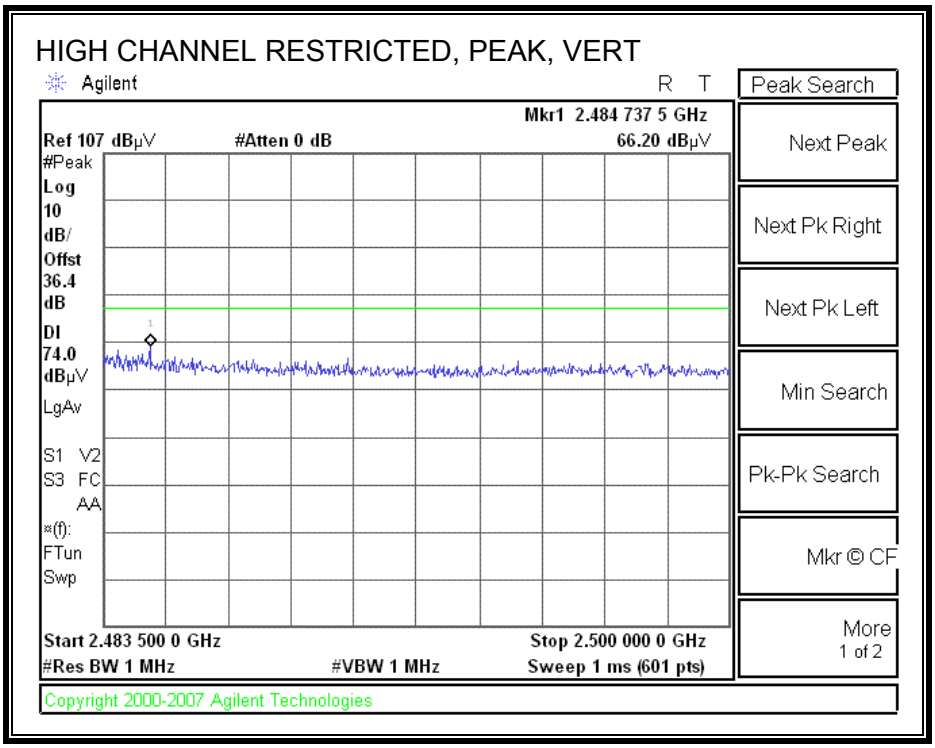


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

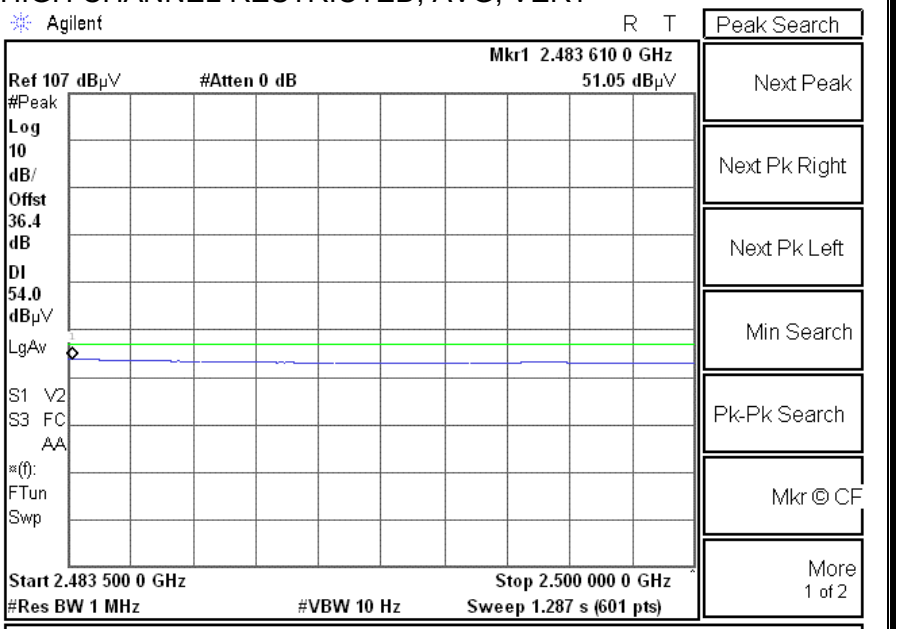




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/25/2008
Test Engineer: Chin Pang
Configuration #: EUT/Dipole and Sleeve Antenna with Sleeve antenna transmitting
Mode: TX, g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

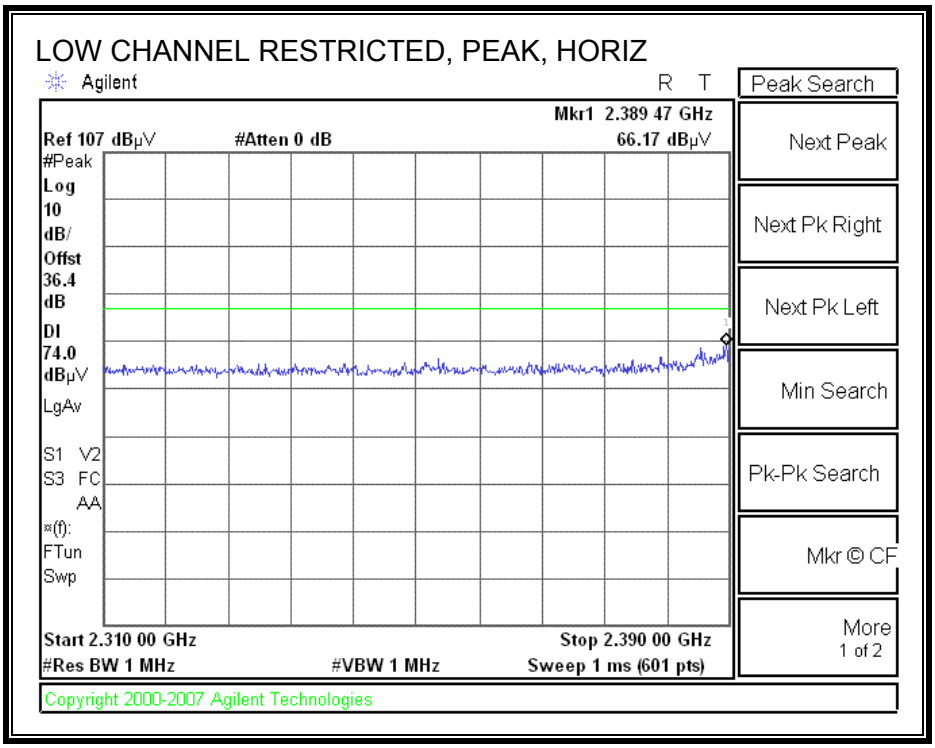
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	41.2	28.5	33.6	7.1	-34.8	0.0	0.0	47.0	34.3	74	54	-27.0	-19.7	V
4.824	3.0	39.8	28.1	33.6	7.1	-34.8	0.0	0.0	45.6	33.9	74	54	-28.4	-20.1	H
Mid Ch, 2437MHz															
4.874	3.0	41.5	28.8	33.6	7.2	-34.9	0.0	0.0	47.4	34.7	74	54	-26.6	-19.3	V
7.311	3.0	42.5	28.9	34.6	8.6	-34.7	0.0	0.0	51.1	37.5	74	54	-22.9	-16.5	V
4.874	3.0	40.8	30.0	33.6	7.2	-34.9	0.0	0.0	46.7	35.9	74	54	-27.3	-18.1	H
7.311	3.0	41.5	29.0	34.6	8.6	-34.7	0.0	0.0	50.1	37.6	74	54	-23.9	-16.4	H
High Ch, 2462MHz															
4.924	3.0	40.0	28.0	33.7	7.2	-34.9	0.0	0.0	46.0	34.0	74	54	-28.0	-20.0	V
7.386	3.0	42.3	28.7	34.6	8.7	-34.6	0.0	0.0	50.9	37.3	74	54	-23.1	-16.7	V
4.924	3.0	39.5	27.8	33.7	7.2	-34.9	0.0	0.0	45.5	33.8	74	54	-28.5	-20.2	H
7.386	3.0	41.3	28.6	34.6	8.7	-34.6	0.0	0.0	49.9	37.2	74	54	-24.1	-16.8	H

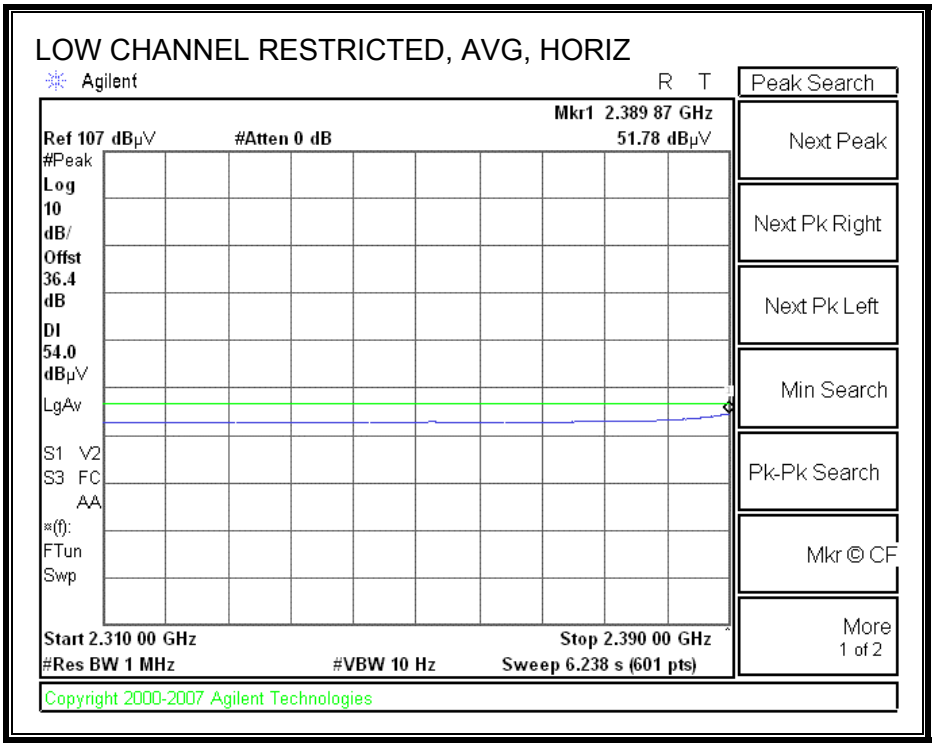
Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

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

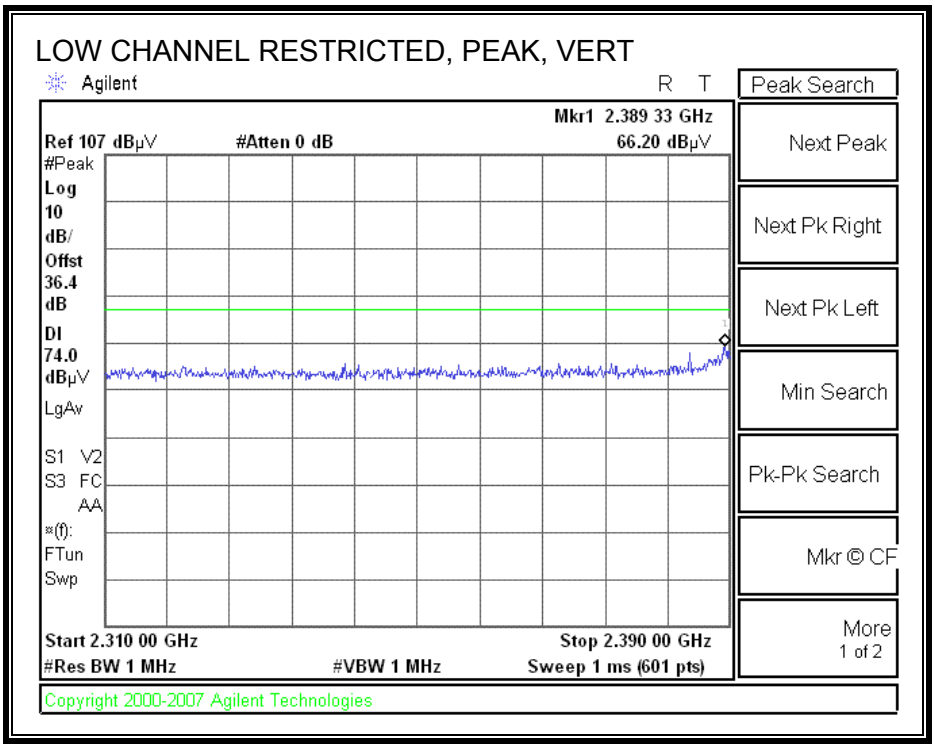
CONFIGURATION #2: DIPOLE ANTENNA TRANSMITTING

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

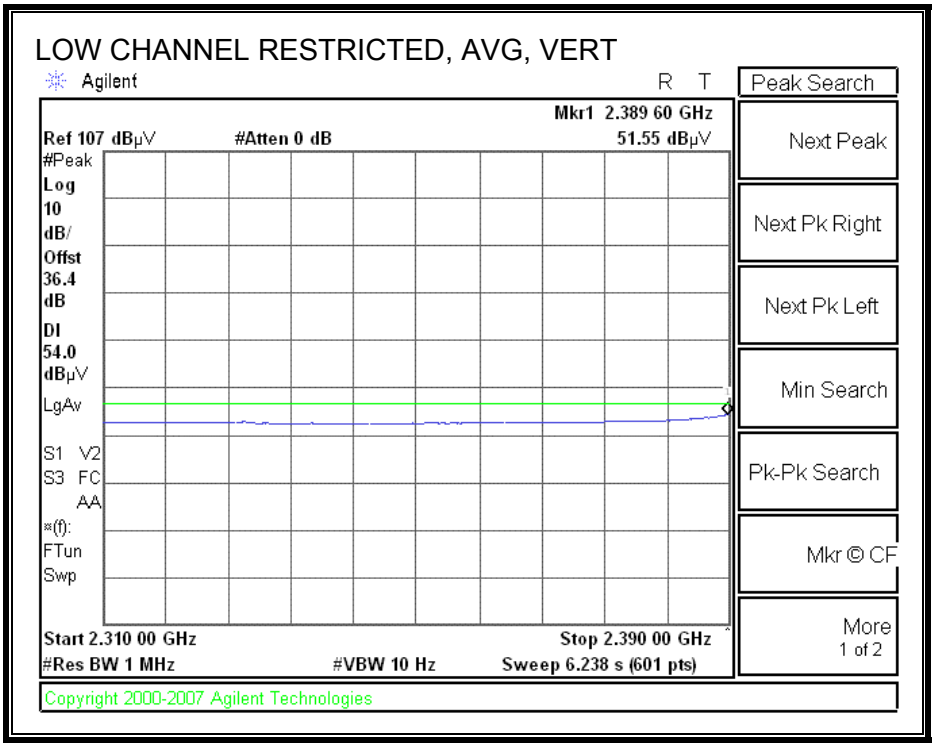




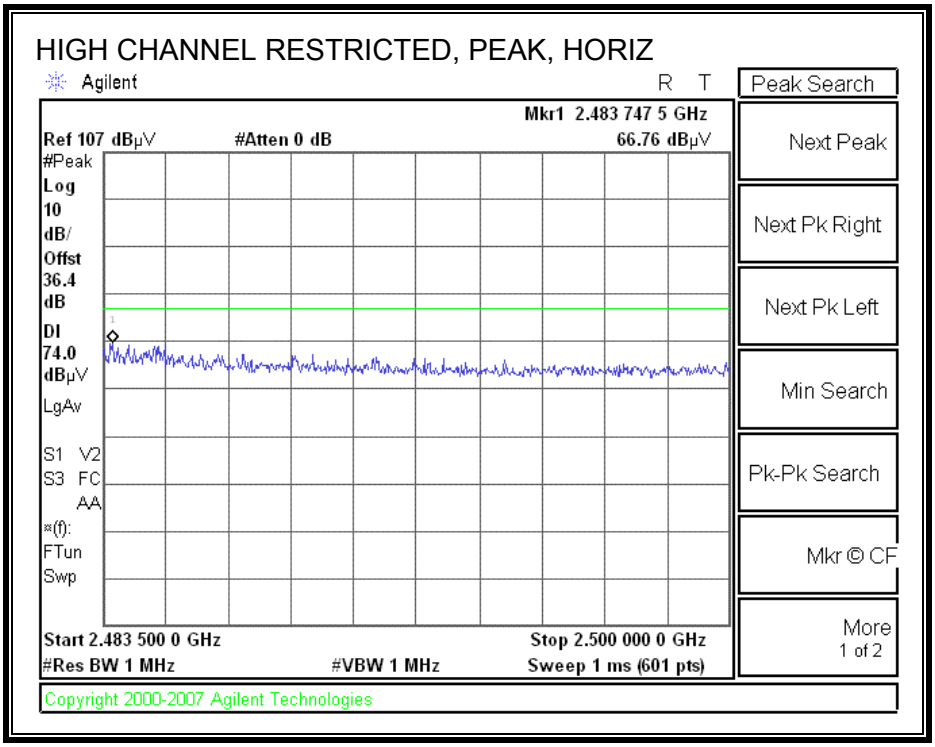
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

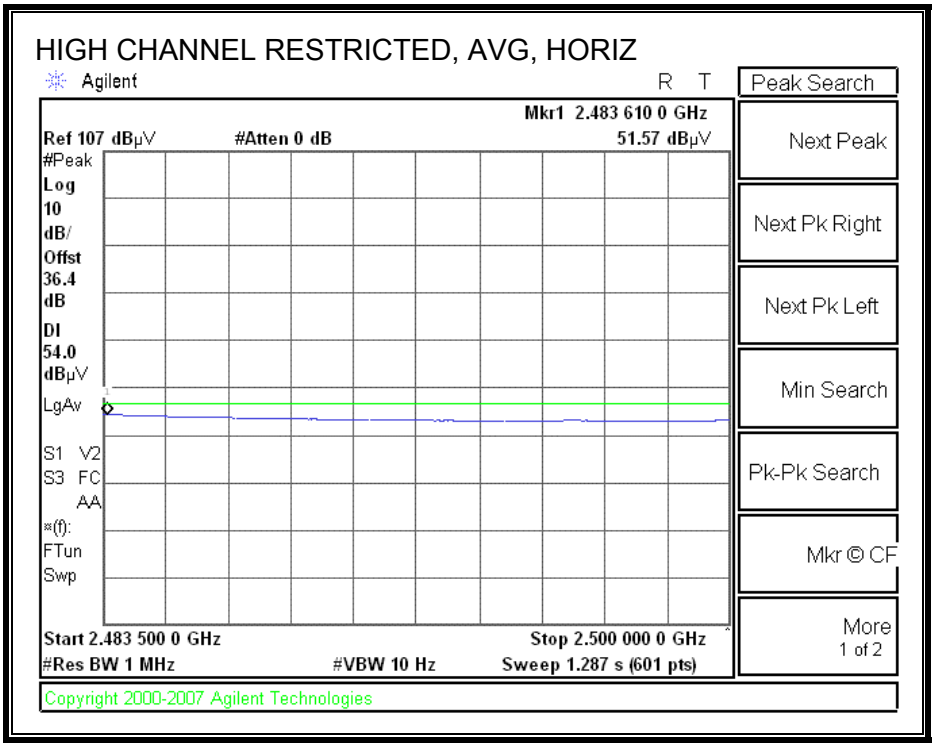


LOW CHANNEL RESTRICTED, AVG, VERT

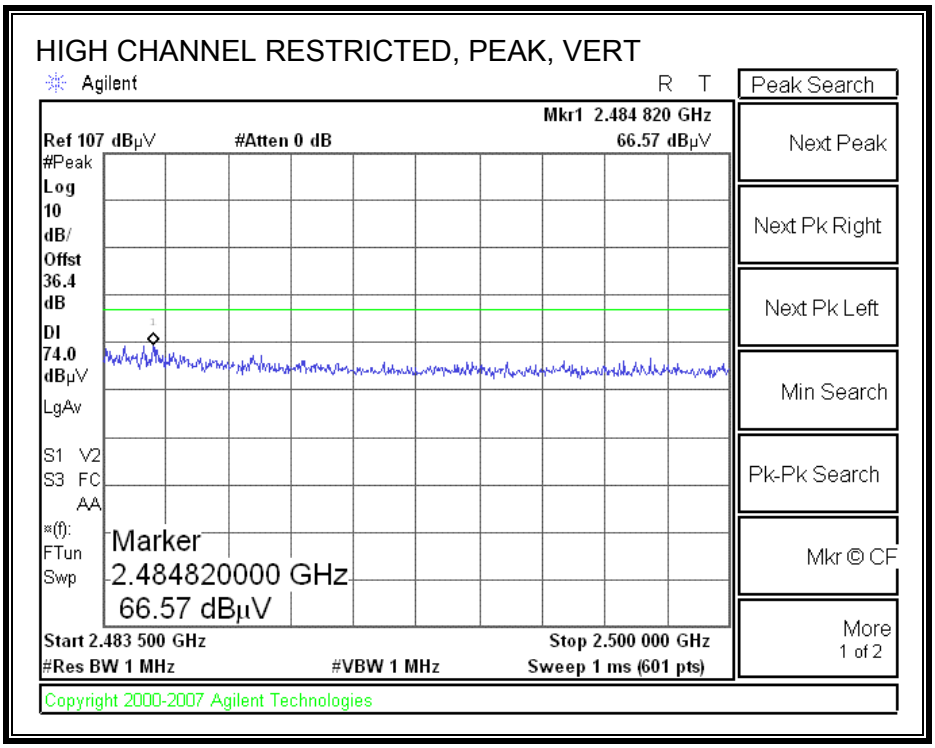


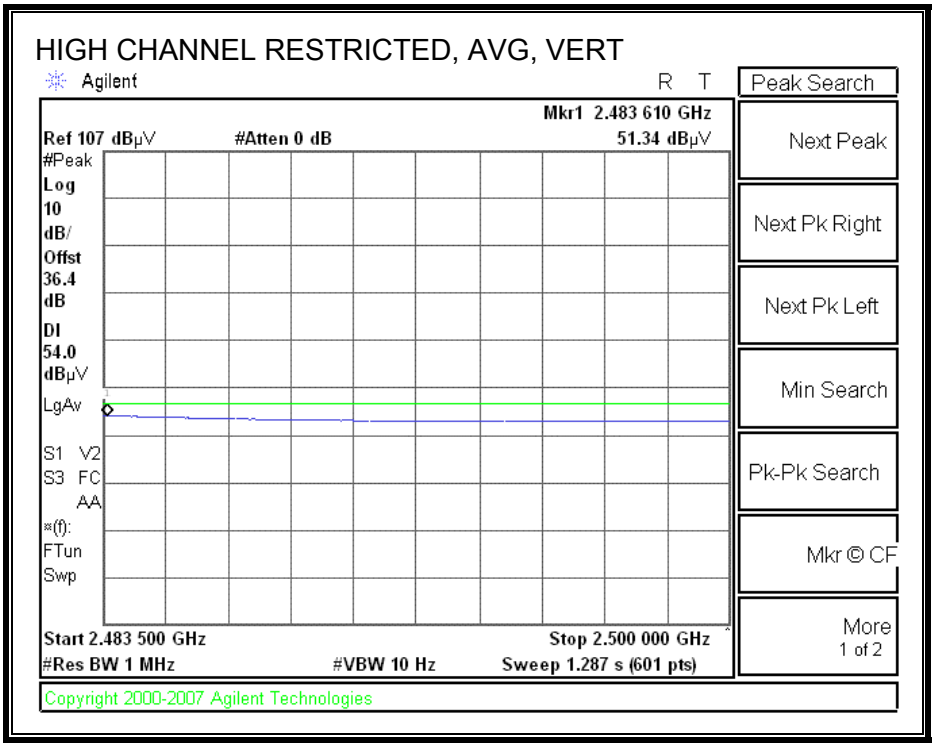
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/25/2008
Test Engineer: Chin Pang
Configuration #2: EUT/Sleeve and Dipole Antenna with Dipole antenna transmitting
Mode: TX, g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

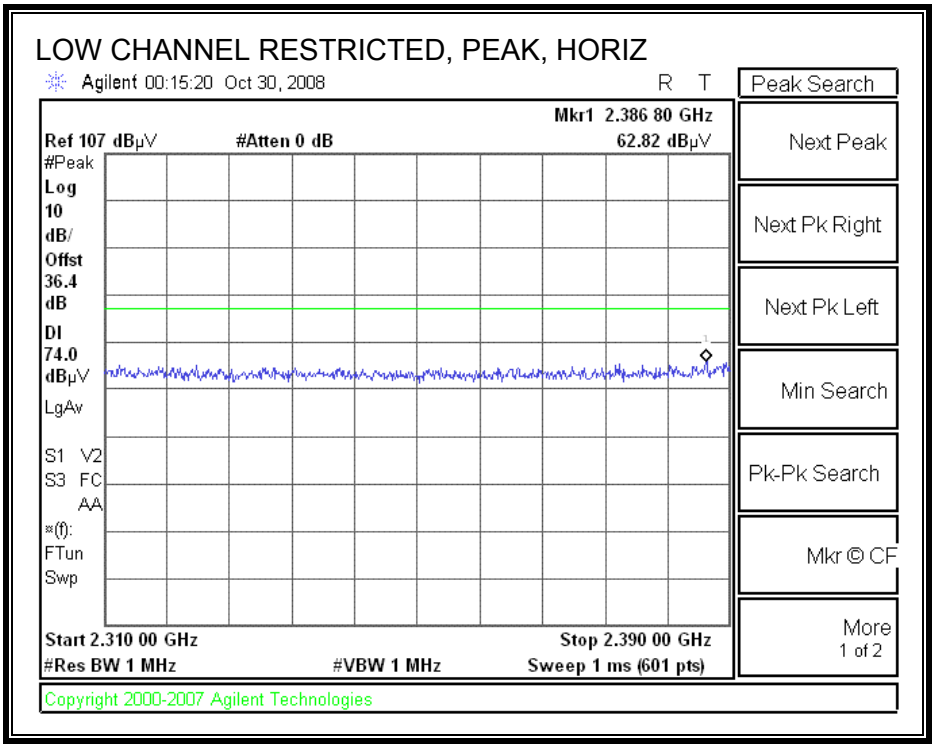
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	40.0	28.0	33.6	7.1	-34.8	0.0	0.0	45.8	33.8	74	54	-28.2	-20.2	V
4.824	3.0	39.8	27.8	33.6	7.1	-34.8	0.0	0.0	45.6	33.6	74	54	-28.4	-20.4	H
Mid Ch, 2437MHz															
4.874	3.0	40.2	28.0	33.6	7.2	-34.9	0.0	0.0	46.1	33.9	74	54	-27.9	-20.1	V
7.311	3.0	41.5	29.0	34.6	8.6	-34.7	0.0	0.0	50.1	37.6	74	54	-23.9	-16.4	V
4.874	3.0	39.5	27.6	33.6	7.2	-34.9	0.0	0.0	45.4	33.5	74	54	-28.6	-20.5	H
7.311	3.0	41.8	29.6	34.6	8.6	-34.7	0.0	0.0	50.4	38.2	74	54	-23.6	-15.8	H
High Ch, 2462MHz															
4.924	3.0	41.0	28.3	33.7	7.2	-34.9	0.0	0.0	47.0	34.3	74	54	-27.0	-19.7	V
7.386	3.0	41.6	29.3	34.6	8.7	-34.6	0.0	0.0	50.2	37.9	74	54	-23.8	-16.1	V
4.924	3.0	40.3	28.0	33.7	7.2	-34.9	0.0	0.0	46.3	34.0	74	54	-27.7	-20.0	H
7.386	3.0	41.0	28.6	34.6	8.7	-34.6	0.0	0.0	49.6	37.2	74	54	-24.4	-16.8	H

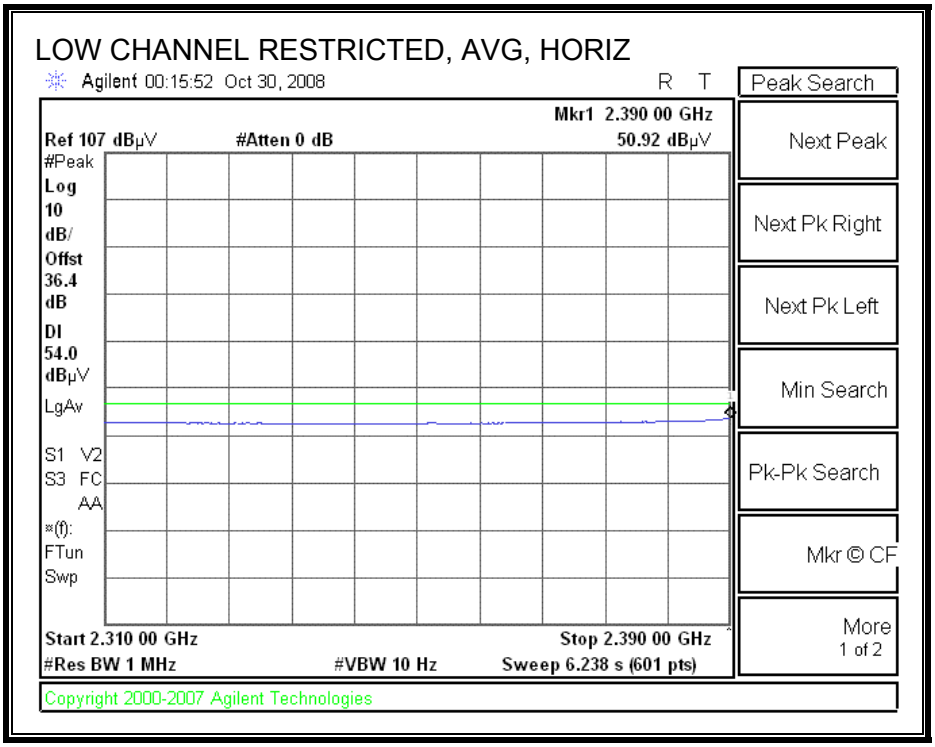
Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

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

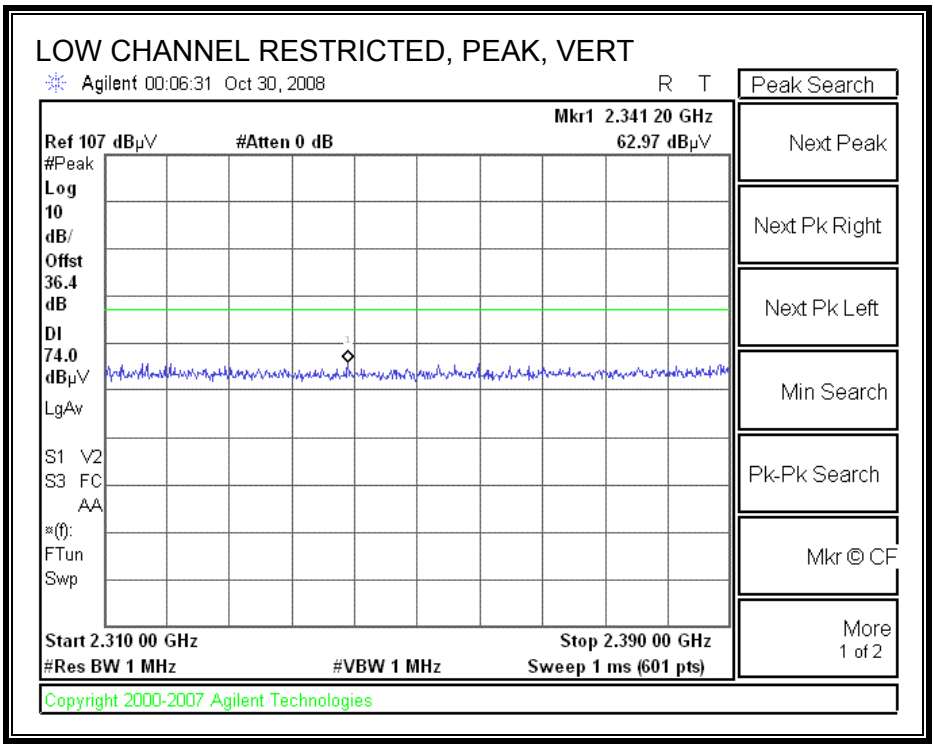
CONFIGURATION #3: PIFA1 ANTENNA TRANSMITTING

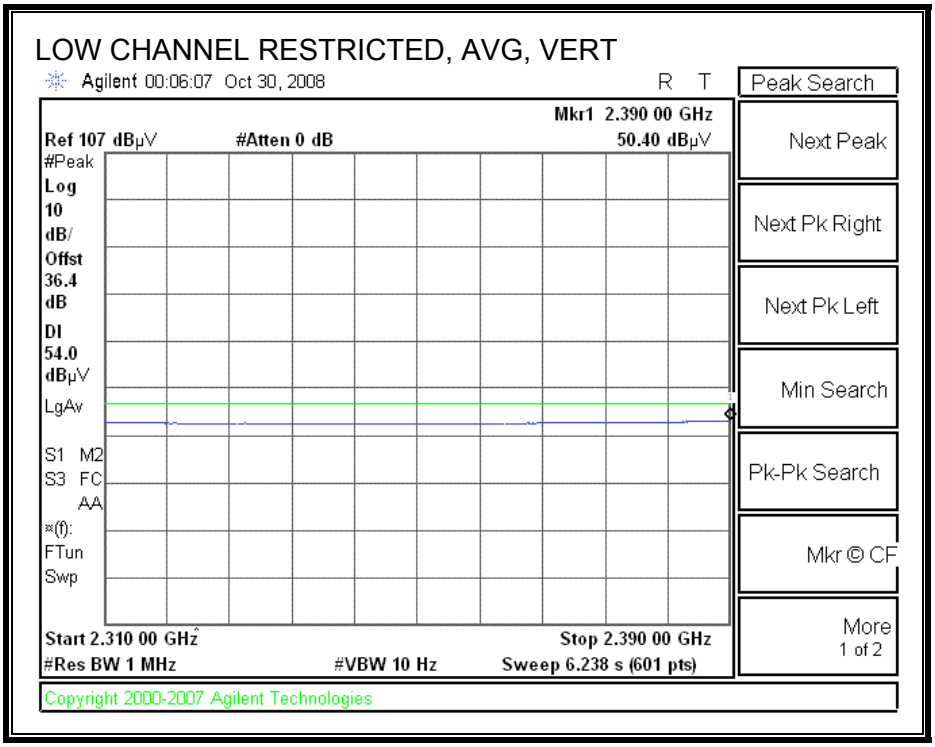
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



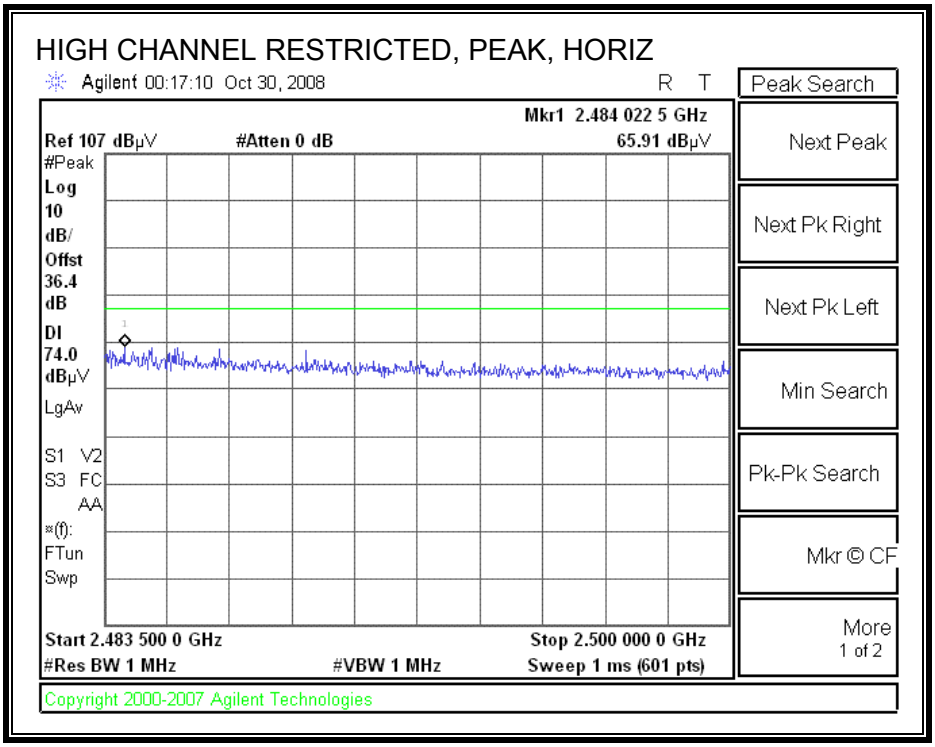


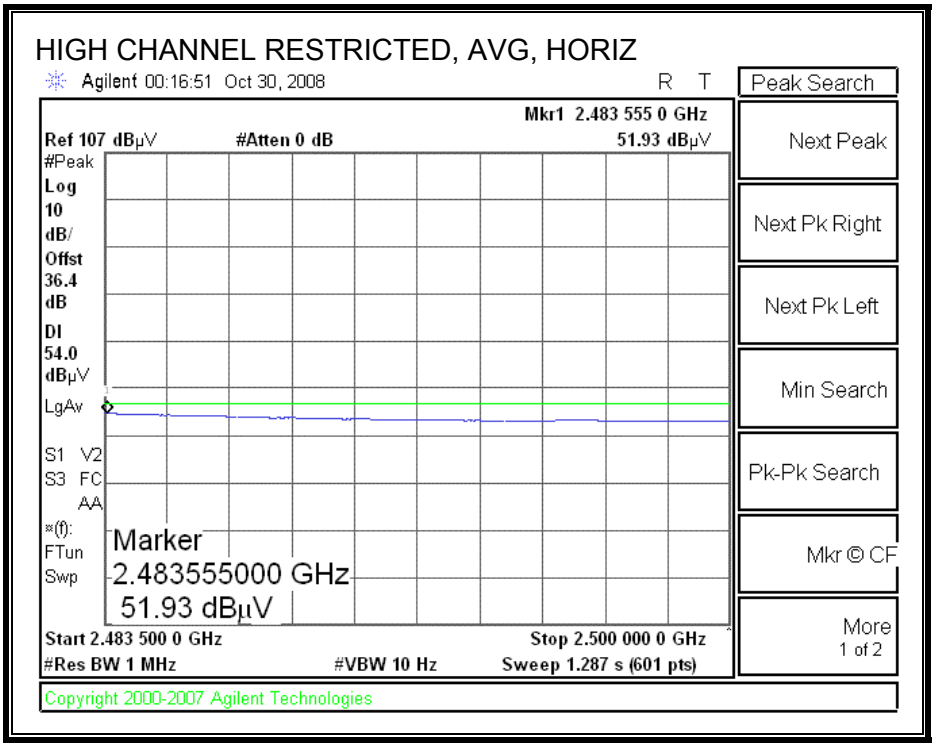
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



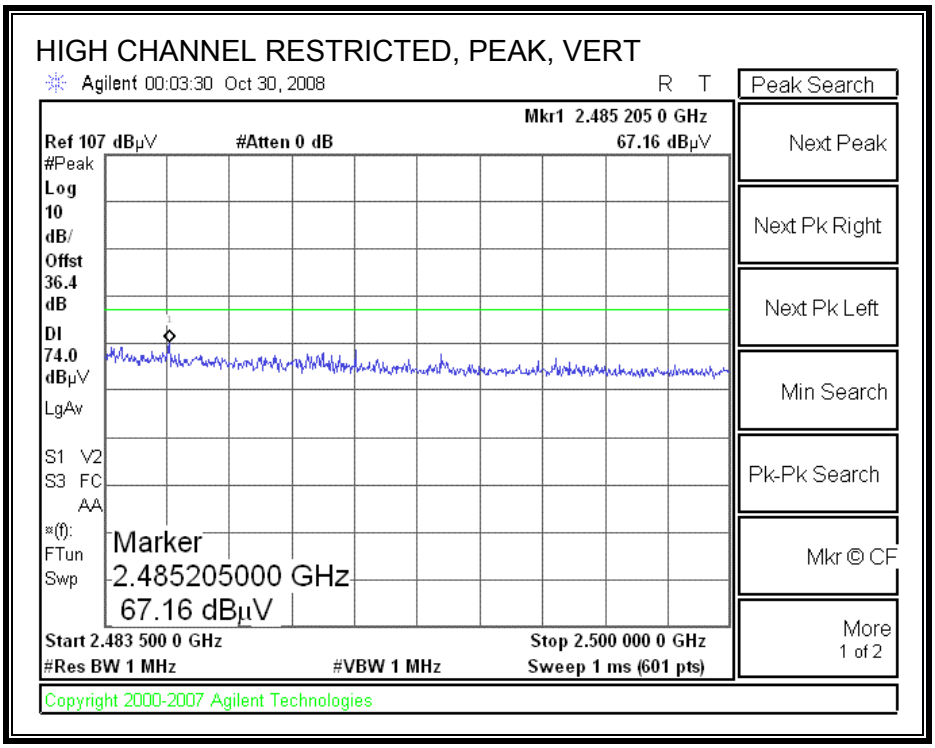


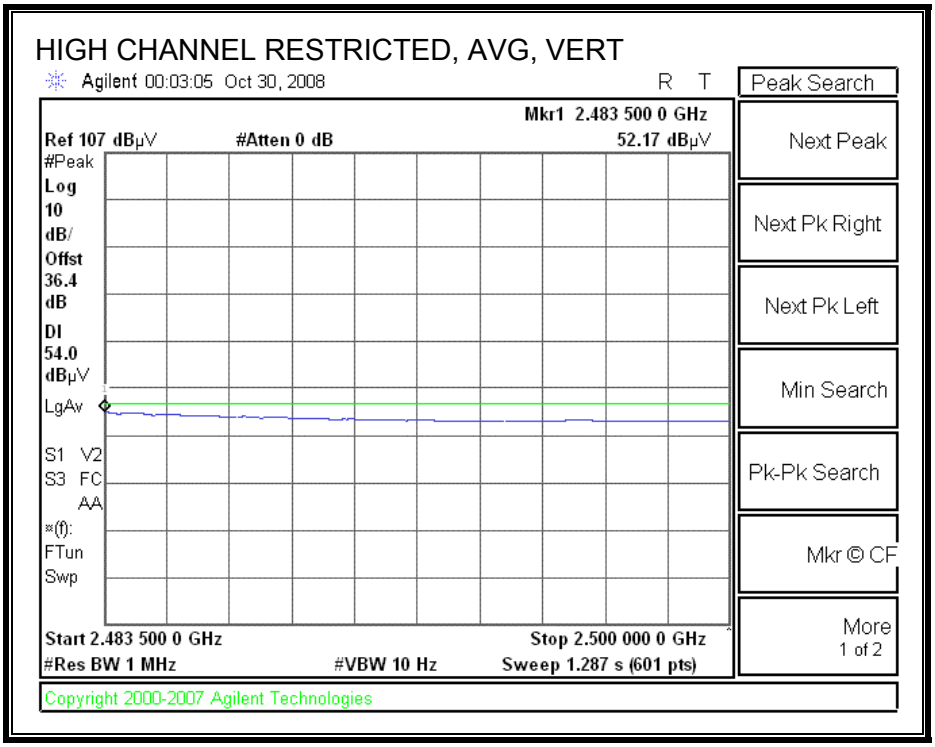
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi
Project #: 08J12194
Date: 10/28/2008
Test Engineer: Chin Pang
Configuration #3: EUT/PIFA1 and PIFA2 Antenna with PIFA1 transmitting
Mode: TX, g mode

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T145 Agilent 3008A0056			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	Chamber Cables	HPF	Reject Filter
		B-5m Chamber		R_001

Peak Measurements
RBW=VBW=1MHz
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	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch, 2412MHz															
4.824	3.0	40.0	28.0	33.6	7.1	-34.8	0.0	0.0	45.8	33.8	74	54	-28.2	-20.2	V
4.824	3.0	41.8	28.7	33.6	7.1	-34.8	0.0	0.0	47.6	34.5	74	54	-26.4	-19.5	H
Mid Ch, 2437MHz															
4.874	3.0	39.8	27.5	33.6	7.2	-34.9	0.0	0.0	45.7	33.4	74	54	-28.3	-20.6	V
7.311	3.0	41.0	29.0	34.6	8.6	-34.7	0.0	0.0	49.6	37.6	74	54	-24.4	-16.4	V
4.874	3.0	40.0	27.5	33.6	7.2	-34.9	0.0	0.0	45.9	33.4	74	54	-28.1	-20.6	H
7.311	3.0	41.8	29.0	34.6	8.6	-34.7	0.0	0.0	50.4	37.6	74	54	-23.6	-16.4	H
High Ch, 2462MHz															
4.924	3.0	40.0	28.0	33.7	7.2	-34.9	0.0	0.0	46.0	34.0	74	54	-28.0	-20.0	V
7.386	3.0	41.3	28.6	34.6	8.7	-34.6	0.0	0.0	49.9	37.2	74	54	-24.1	-16.8	V
4.924	3.0	40.5	27.6	33.7	7.2	-34.9	0.0	0.0	46.5	33.6	74	54	-27.5	-20.4	H
7.386	3.0	41.0	28.5	34.6	8.7	-34.6	0.0	0.0	49.6	37.1	74	54	-24.4	-16.9	H

Rev. 10.15.08
Note: No other emissions were detected above the system noise floor.

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

7.2.3. RECEIVER ABOVE 1 GHz

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

7.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL DATA

```
Condition: HORIZONTAL
Test Operator:: Chin Pang
Project #:     : 08J12194
Company:       : Mitsumi
Configuration:: EUT/Sleeve and Dipole Antennas
Mode :         : TX ( Worst Case )
Target:        : FCC CLASS B
```

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	147.370	47.64	-13.64	34.00	43.50	-9.50	Peak
2	336.520	46.50	-10.05	36.45	46.00	-9.55	Peak
3	481.050	46.50	-5.37	41.13	46.00	-4.87	Peak
4	610.060	41.50	-2.58	38.92	46.00	-7.08	Peak
5	671.170	42.33	-1.13	41.21	46.00	-4.79	Peak
6	864.200	38.67	2.16	40.82	46.00	-5.18	Peak

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

VERTICAL DATA

Condition: VERTICAL
Test Operator:: Chin Pang
Project #: : 08J12194
Company: : Mitsumi
Configuration:: EUT/Sleeve and Dipole Antennas
Mode : : TX (Worst Case)
Target: : FCC CLASS B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	192.960	49.50	-12.66	36.84	43.50	-6.66	Peak
2	336.520	52.33	-10.05	42.28	46.00	-3.72	Peak
3	624.610	43.17	-2.28	40.89	46.00	-5.11	Peak
4	671.170	40.83	-1.13	39.71	46.00	-6.29	Peak
5	864.200	36.83	2.16	38.99	46.00	-7.01	Peak
6	961.200	35.67	3.39	39.06	54.00	-14.94	Peak

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	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

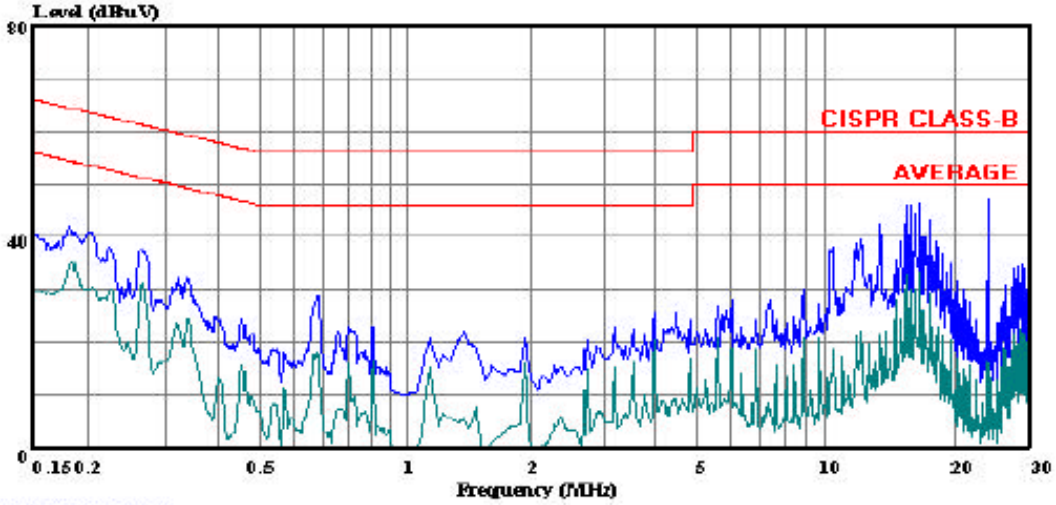
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.18	41.78	--	35.17	0.00	64.39	54.39	-22.61	-19.22	L1
15.55	46.12	--	34.87	0.00	60.00	50.00	-13.88	-15.13	L1
24.00	47.01	--	46.66	0.00	60.00	50.00	-12.99	-3.34	L1
0.18	39.98	--	34.45	0.00	64.39	54.39	-24.41	-19.94	L2
15.89	45.03	--	36.08	0.00	60.00	50.00	-14.97	-13.92	L2
24.00	47.03	--	46.74	0.00	60.00	50.00	-12.97	-3.26	L2
6 Worst Data									

LINE 1 RESULTS

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

Data#: 21 File#: 08j12194.emi Date: 10-27-2008 Time: 09:26:55



(Line Conduction)

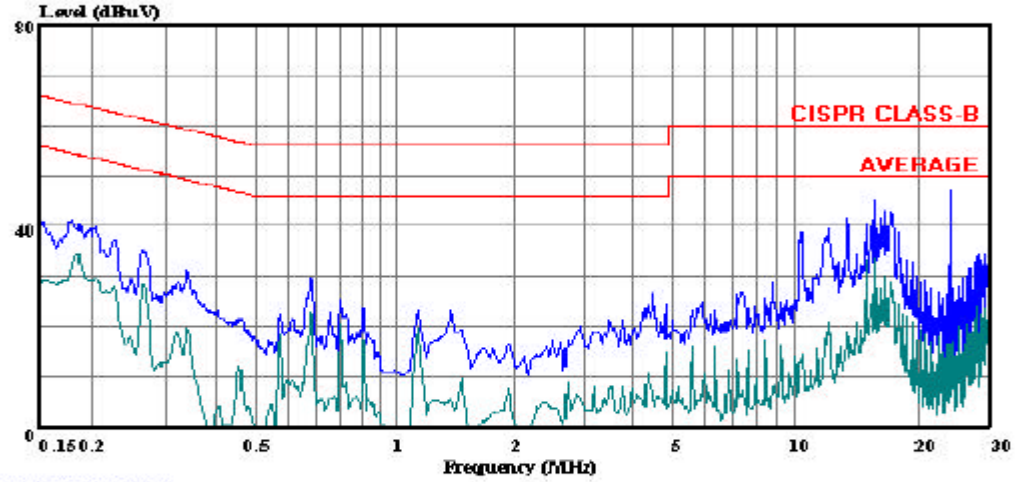
Trace: 19 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: : 08J12194
Company: : Mitsumi
Configuration:: EUT / Antenna
Mode: : TX (worst Case)
Target: : FCC CLASS B
Voltage: : 115 VAC / 60Hz
: L1: Peak (Blue), Average (Green)

LINE 2 RESULTS

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

Data#: 28 File#: 08j12194.emi Date: 10-27-2008 Time: 09:36:38



Trace: 26 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: : 08J12194
Company: : Mitsumi
Configuration:: EUT / Antenna
Mode: : TX (worst Case)
Target: : FCC CLASS B
Voltage: : 115 VAC / 60Hz
: L2: Peak (Blue), Average (Green)

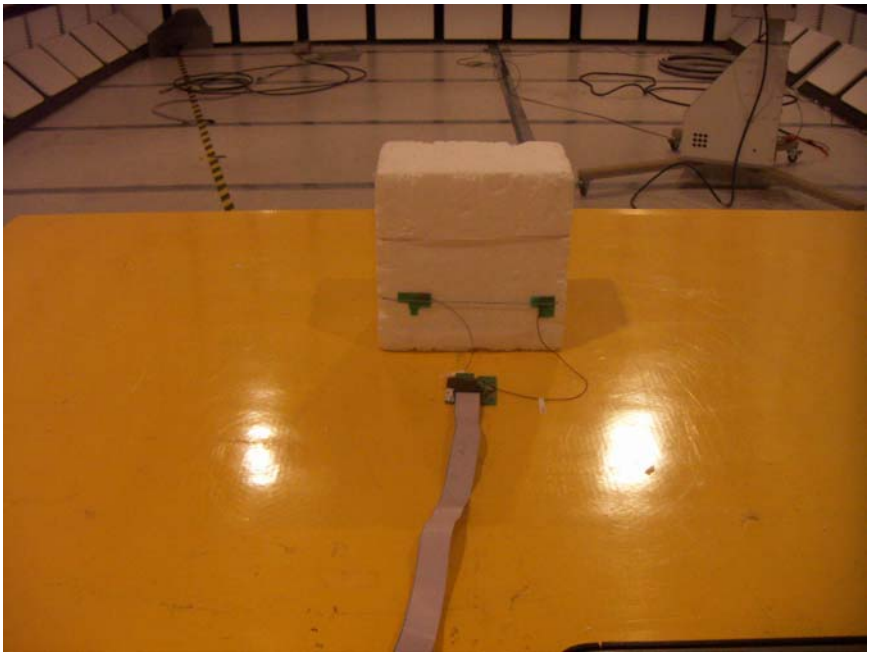
9. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

RADIATED RF MEASUREMENT SETUP

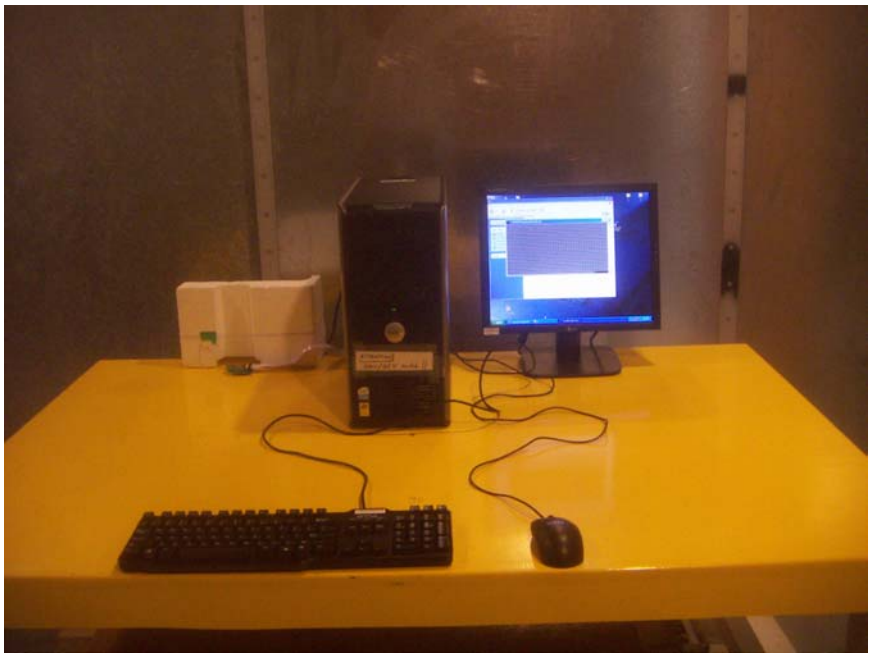
RADIATED FRONT PHOTO



RADIATED BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO



LINE CONDUCTED BACK PHOTO

END OF REPORT