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

FOR

WiFi MODULE

MODEL NUMBER: DWM-W016

FCC ID: EW4DWMW016

IC: 4250A-DWMW016

REPORT NUMBER: 08J11775-1

ISSUE DATE: MAY 13, 2008

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

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	05/13/08	Initial Issue	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: WiFi MODULE

MODEL: DWM-W016

SERIAL NUMBER: 00A096800B7F

DATE TESTED: MAY 2-8, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
RSS-210 Issue 7 Annex 8 and 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 expressions of Pass/Fail in this report are opinions expressed by CCS based on interpretations of the 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:

FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

THANH NGUYEN
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. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	18.63	72.95
2412 - 2462	802.11g	22.58	181.13

5.3. 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

5.4. 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.

5.5. 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.

5.6. 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

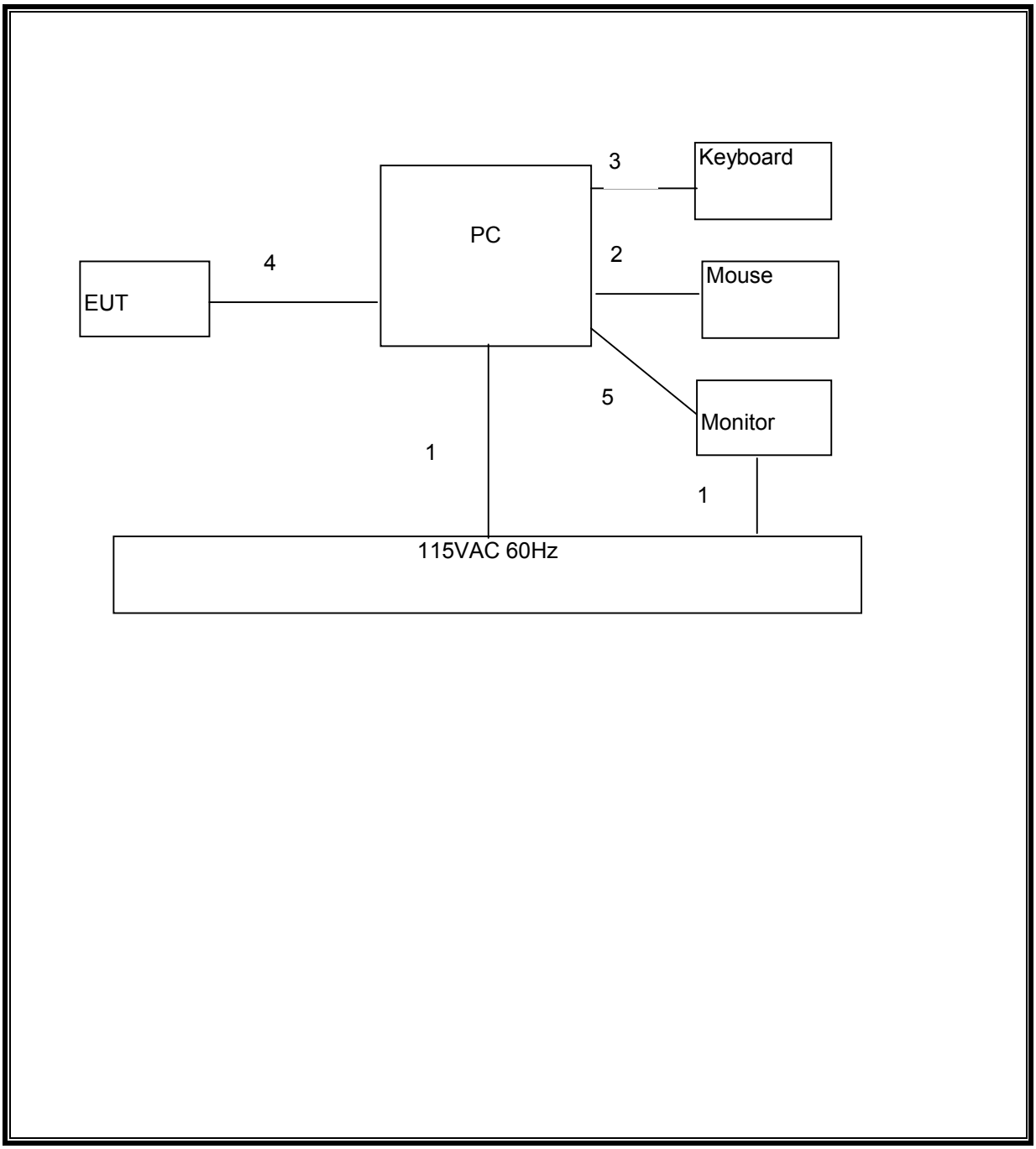
I/O CABLES

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	Mouse	1	PS/2	Shielded	2m	N/A
3	KB	1	PS/2	Un-shielded	2m	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 Date**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/14/06	10/08/09
Peak / Average Power Sensor	Agilent	E9327A	C00964	12/07/07	12/07/09
Power Meter	Agilent / HP	E4446A	C00986	11/30/07	05/30/09
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	09/05/07	12/05/08
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	09/28/07	09/28/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	05/09/07	03/31/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	09/27/07	09/27/08
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/15/07	03/31/09
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	09/29/07	09/29/08
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/07	10/25/08
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/25/07	10/25/08
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	10/16/06	06/08/09

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

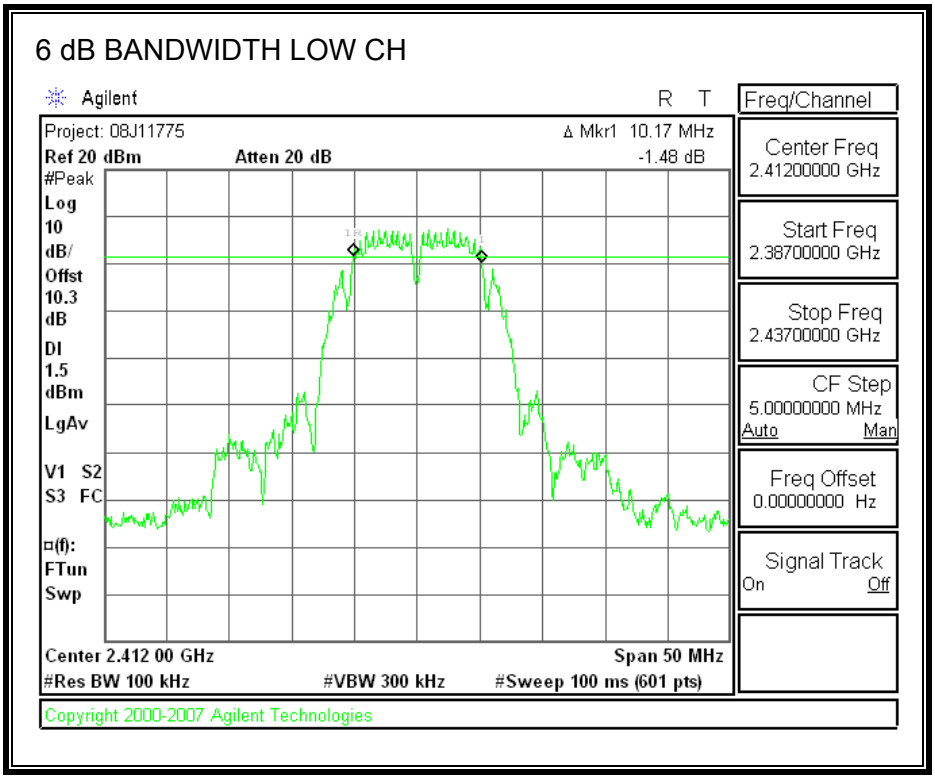
TEST PROCEDURE

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

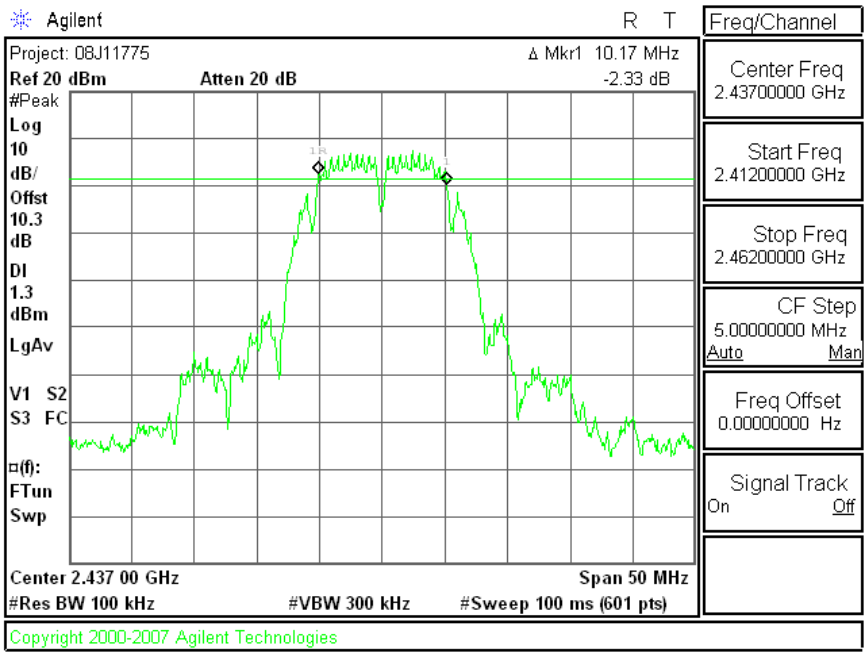
RESULTS

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

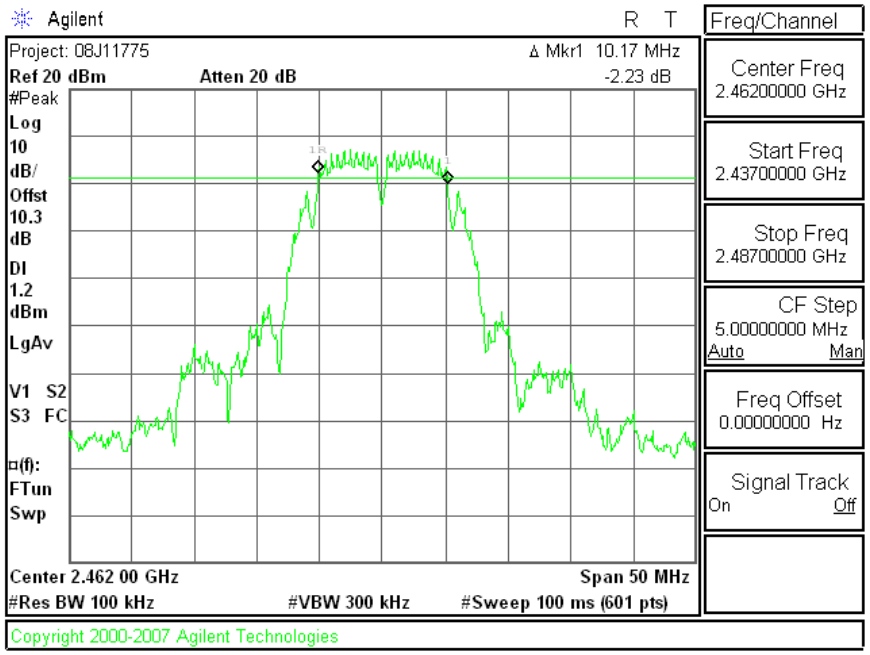
6 dB BANDWIDTH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

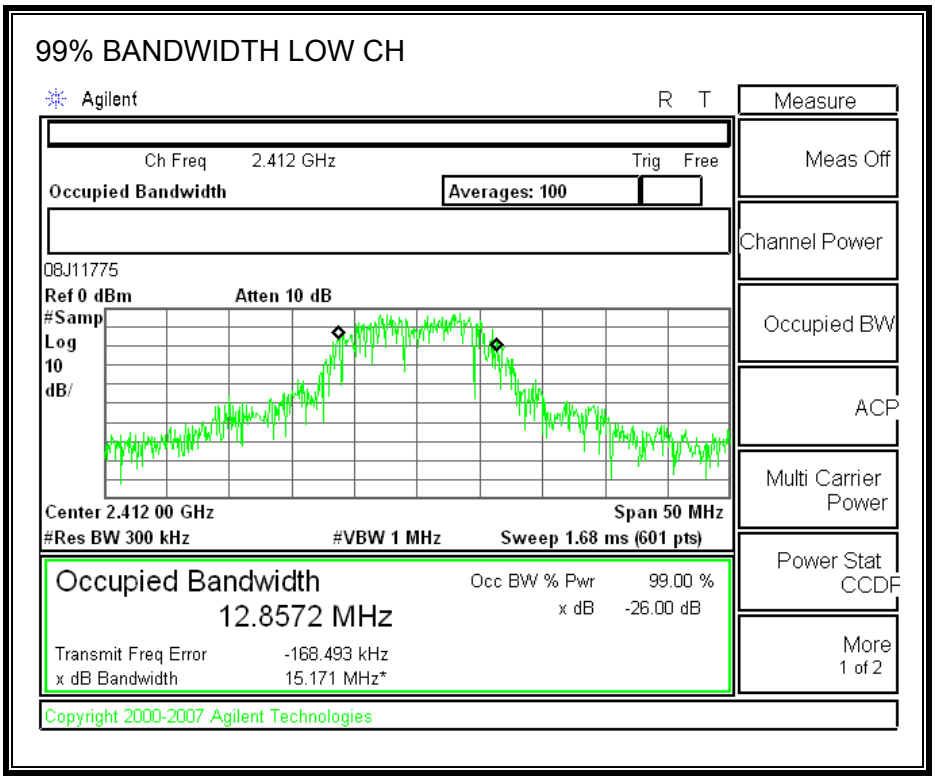
TEST PROCEDURE

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

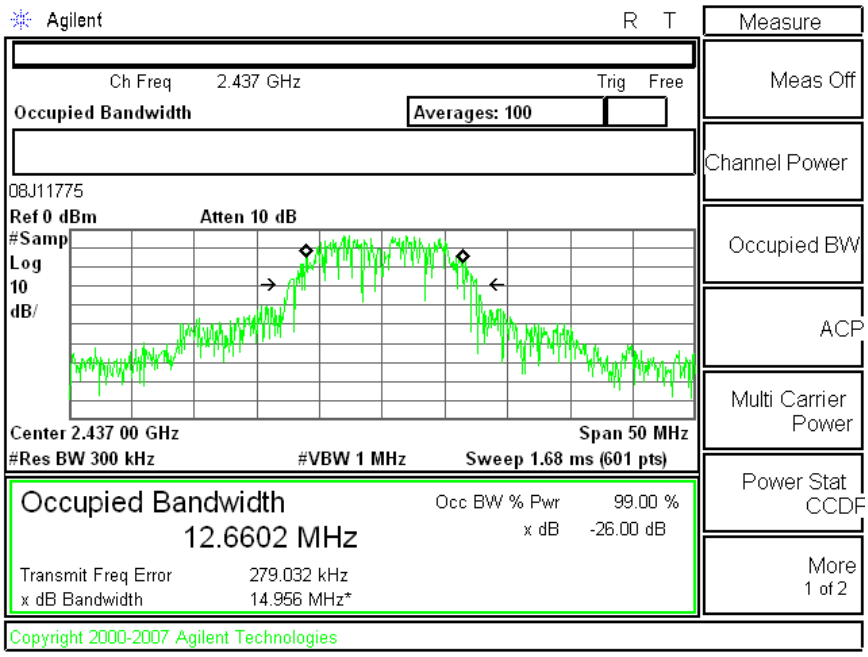
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.8572
Middle	2437	12.6602
High	2462	12.7483

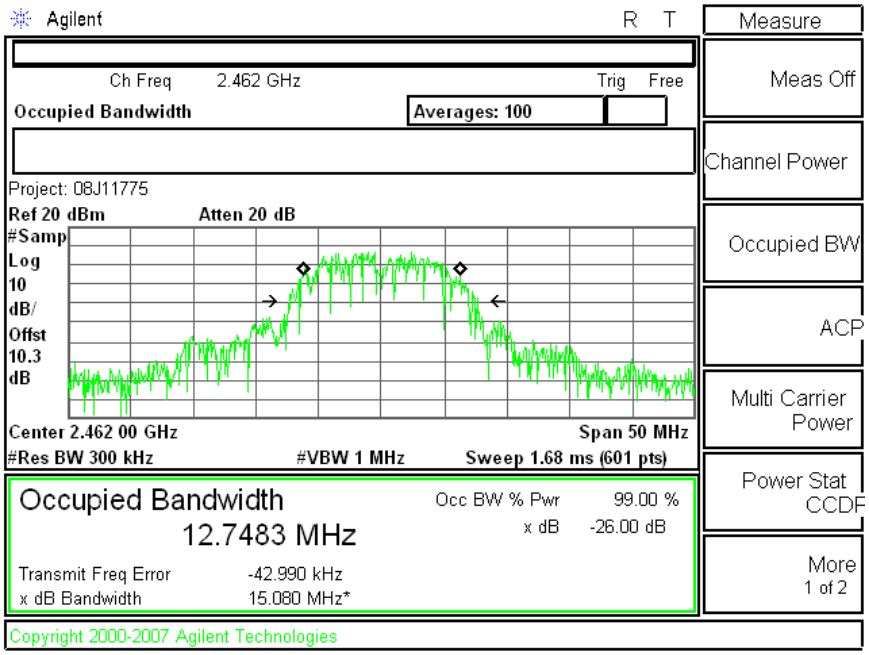
99% BANDWIDTH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

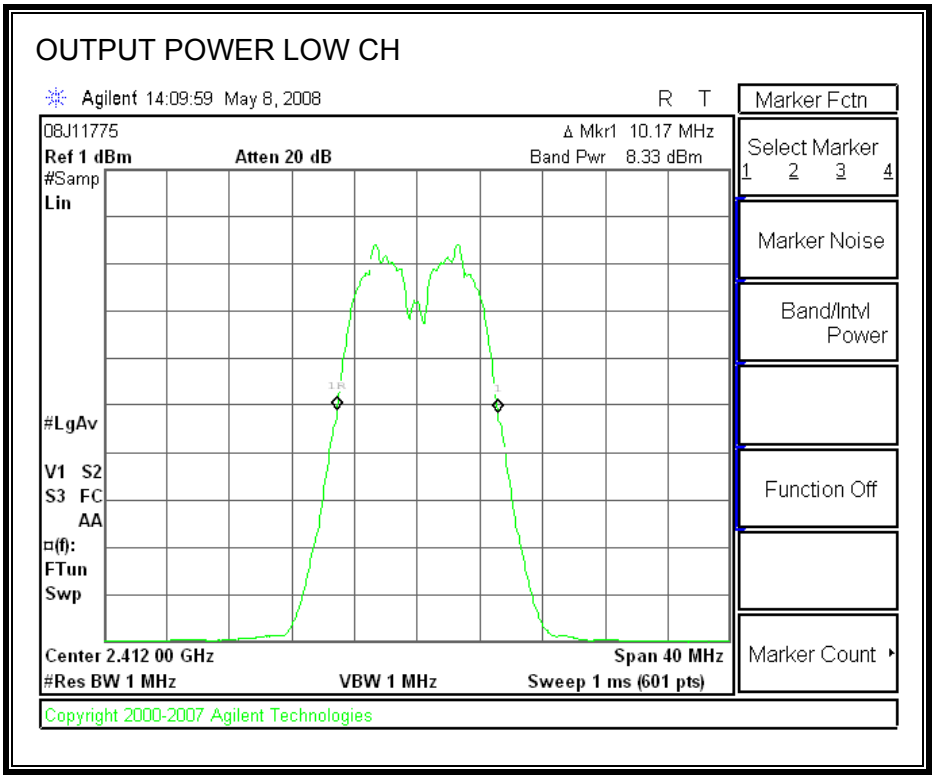
TEST PROCEDURE

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.

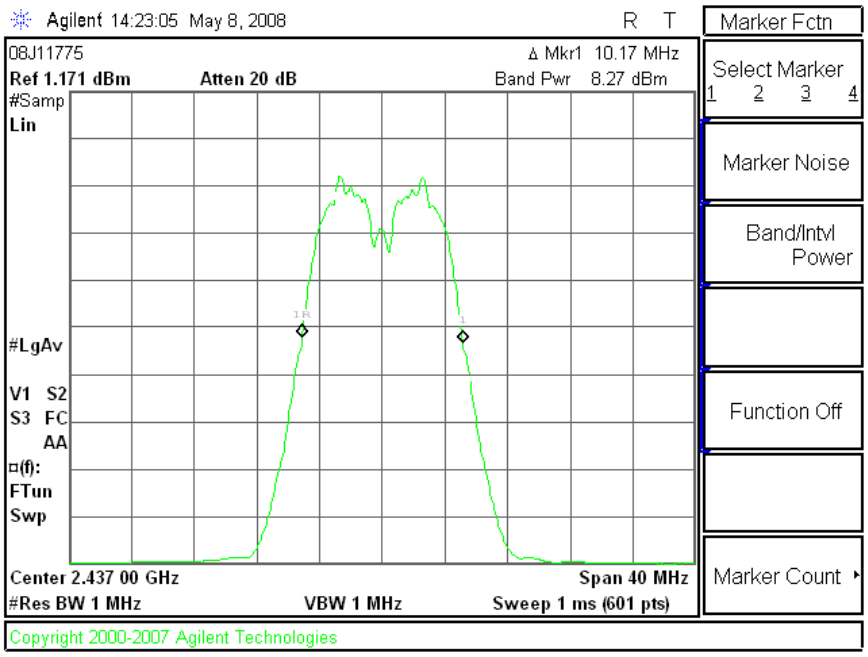
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	8.33	10.3	18.63	30	-11.37
Middle	2437	8.27	10.3	18.57	30	-11.43
High	2462	8.29	10.3	18.59	30	-11.41

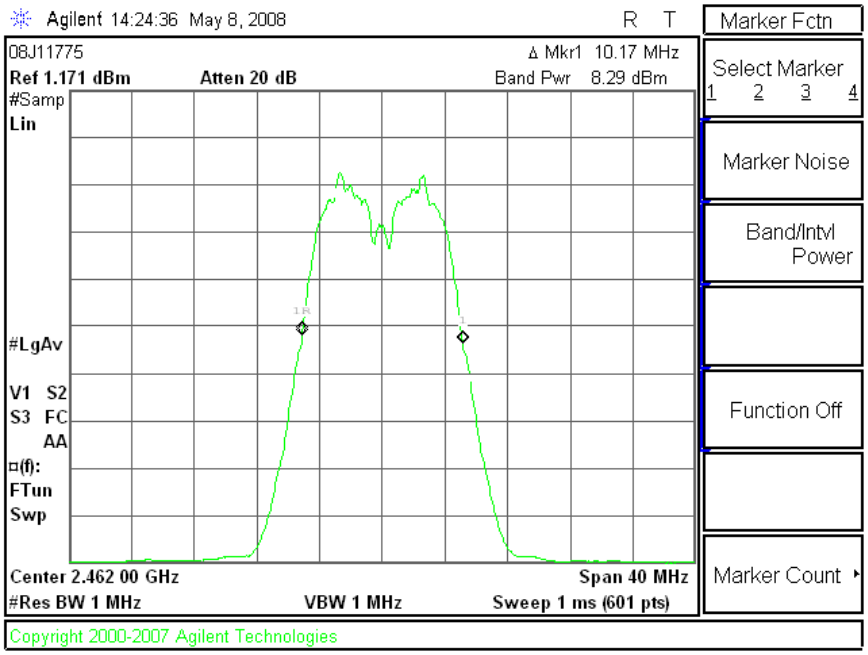
OUTPUT POWER



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



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 10.3 dB (including 10 dB pad and .3 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	16.19
Middle	2437	16.32
High	2462	16.25

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

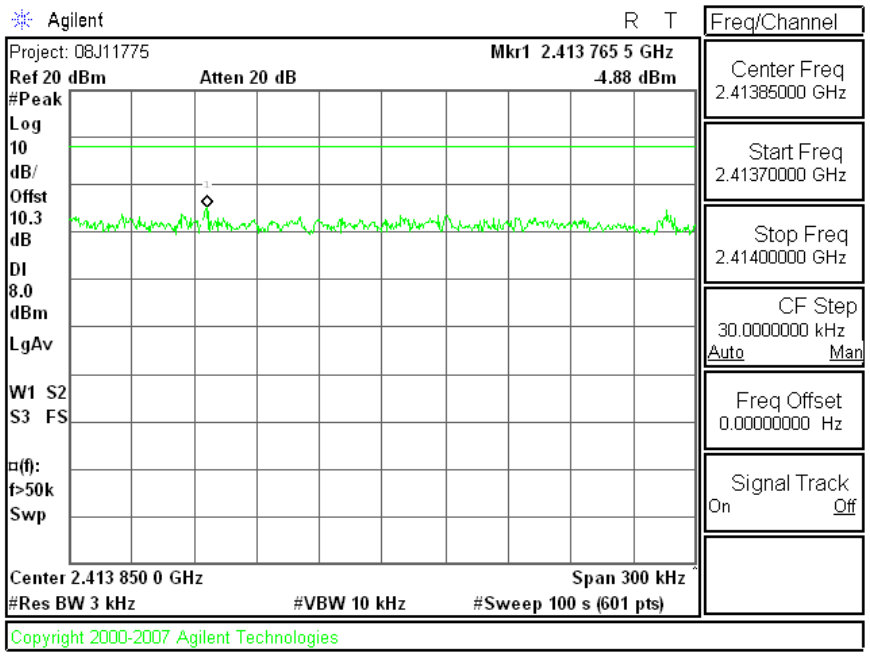
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

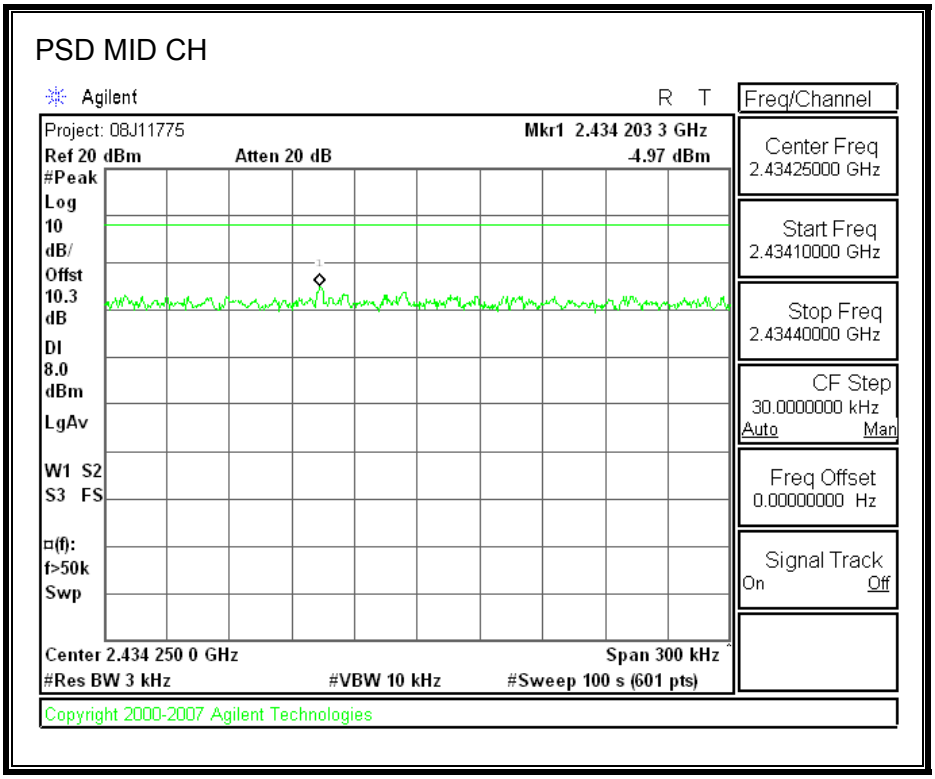
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-4.88	8	-12.88
Middle	2437	-4.97	8	-12.97
High	2462	-5.17	8	-13.17

POWER SPECTRAL DENSITY

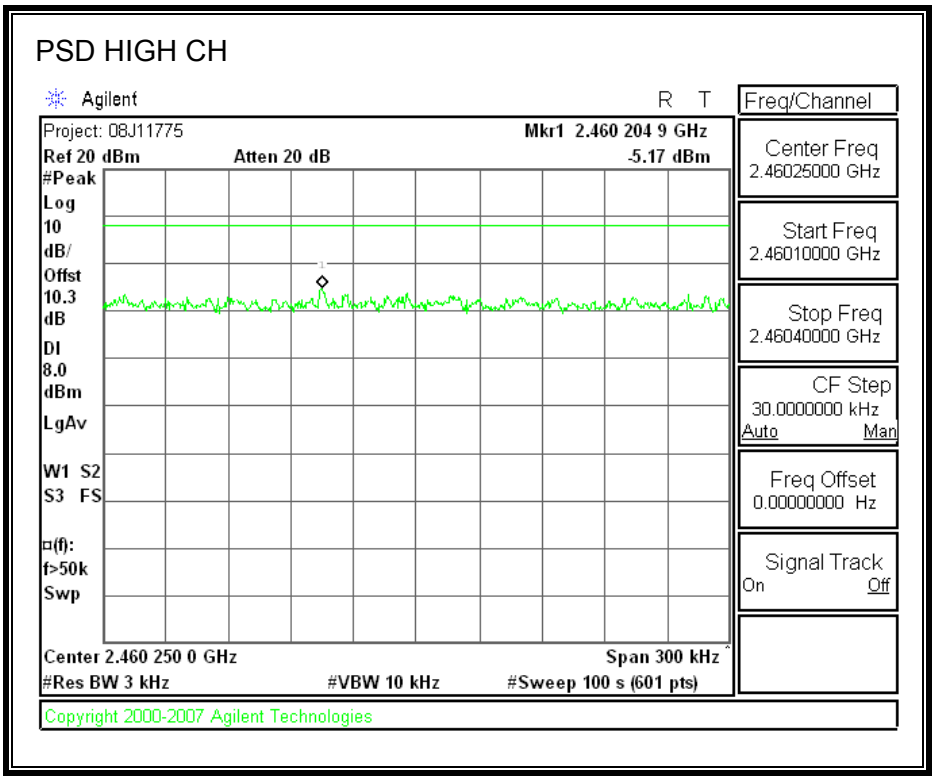
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

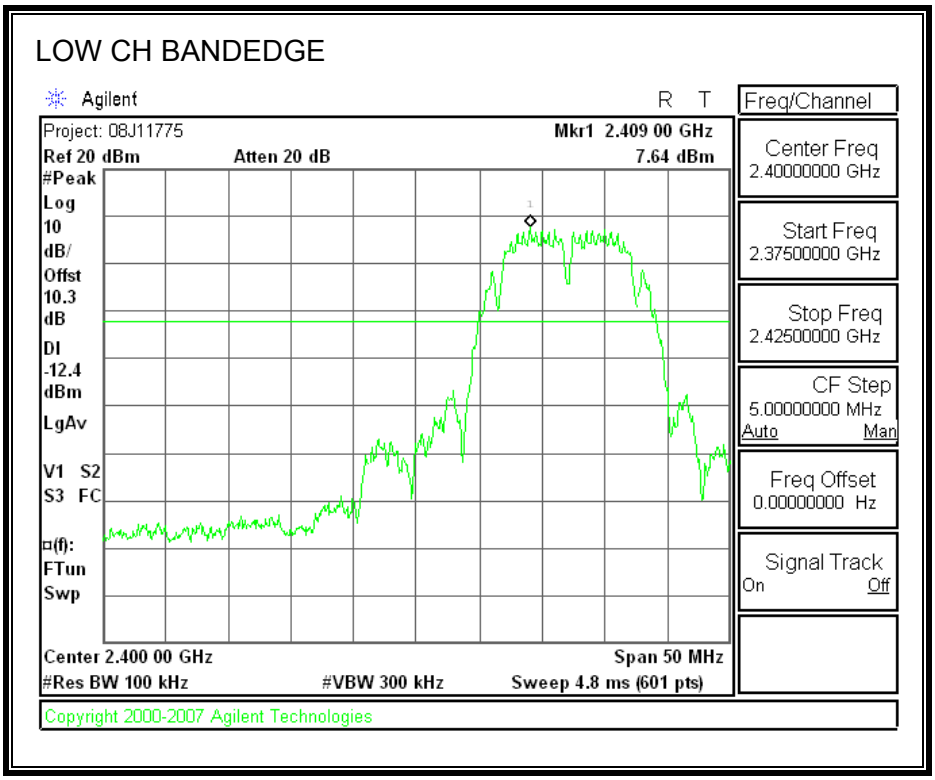
TEST PROCEDURE

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

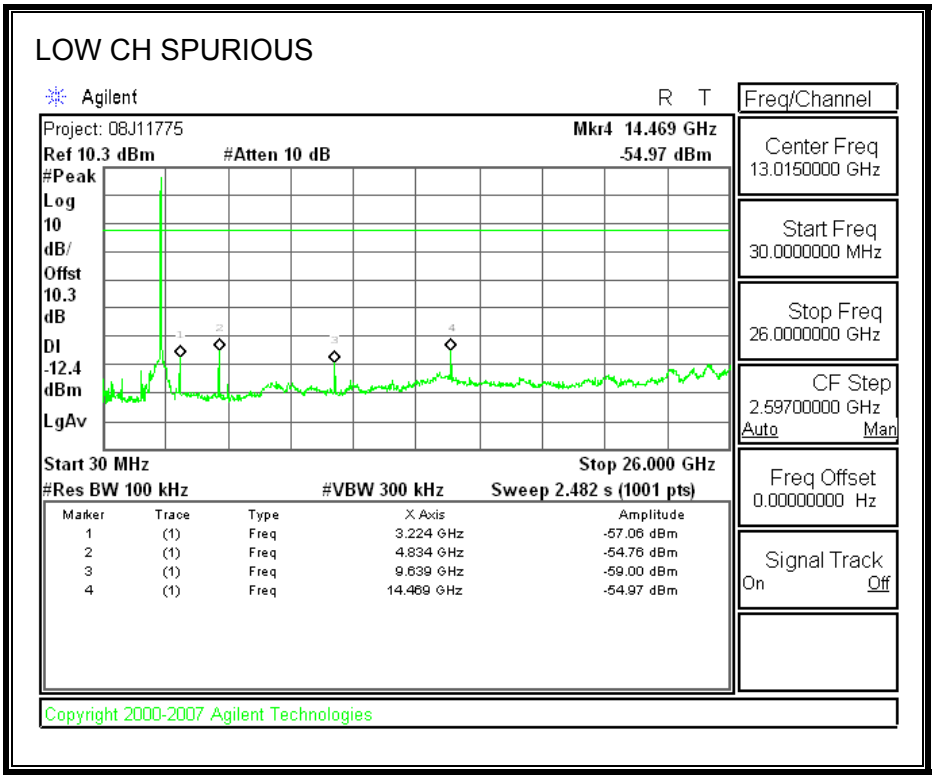
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

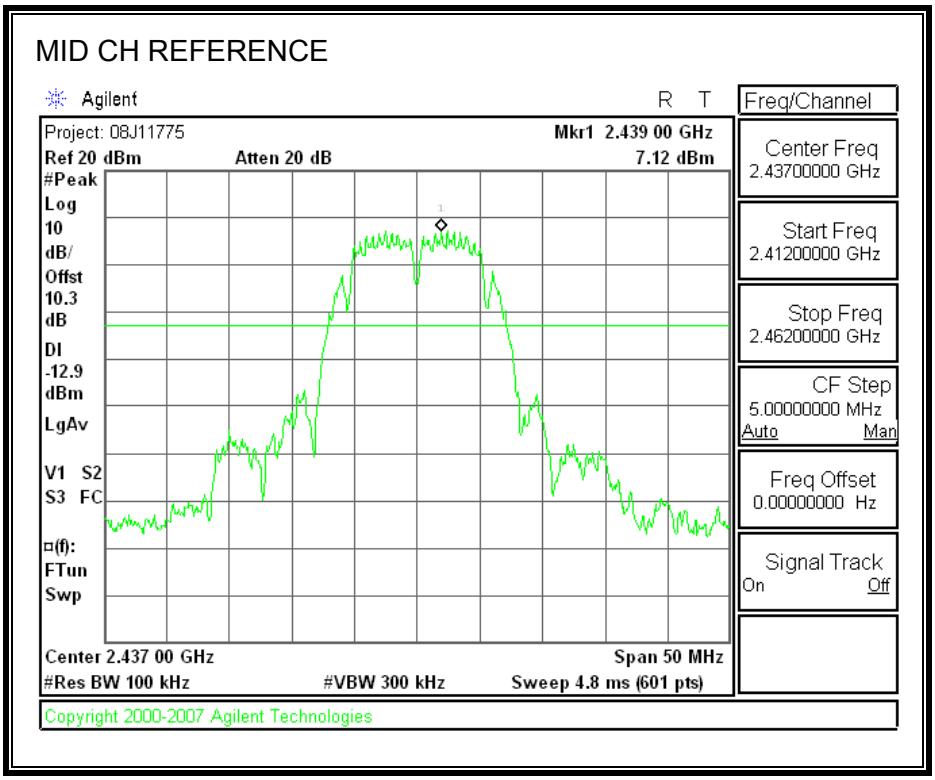
SPURIOUS EMISSIONS, LOW CHANNEL



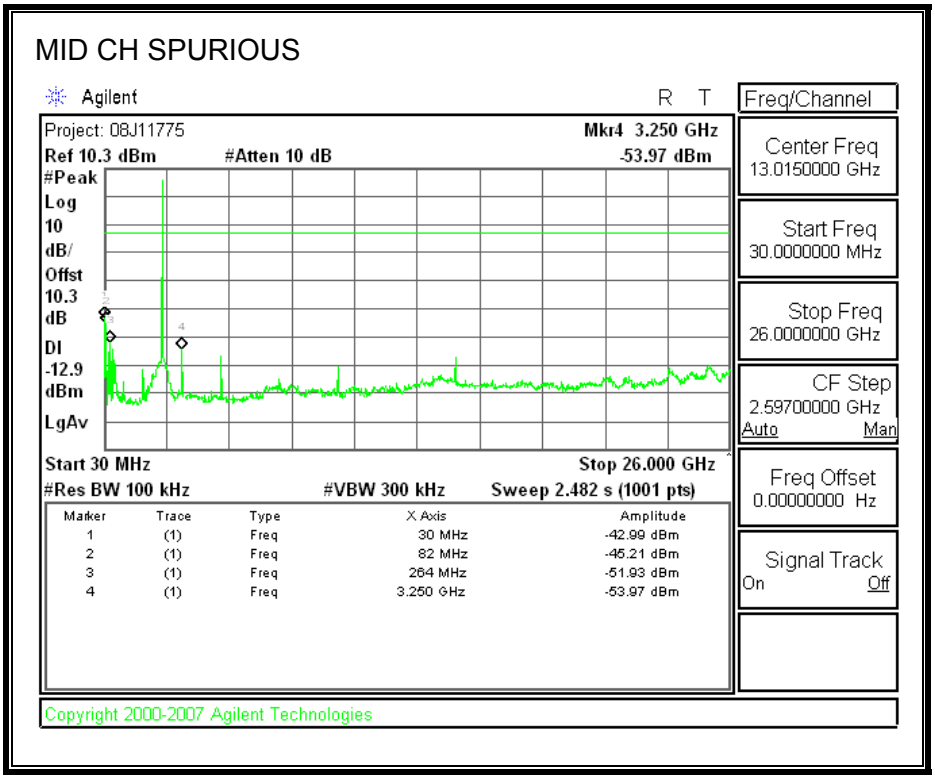
LOW CH SPURIOUS



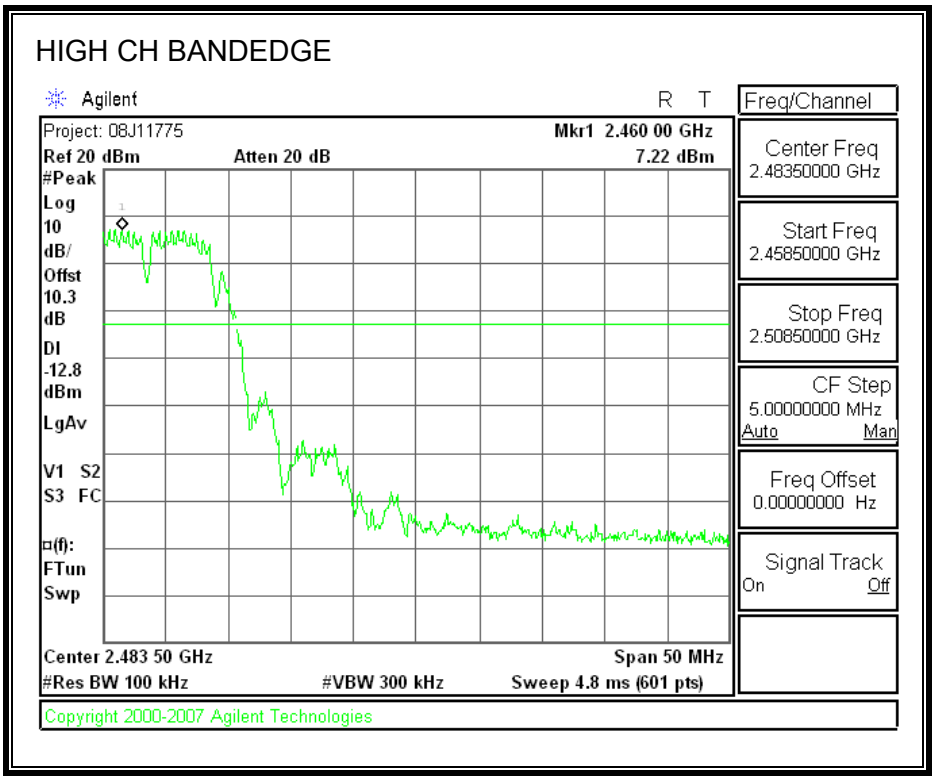
SPURIOUS EMISSIONS, MID CHANNEL



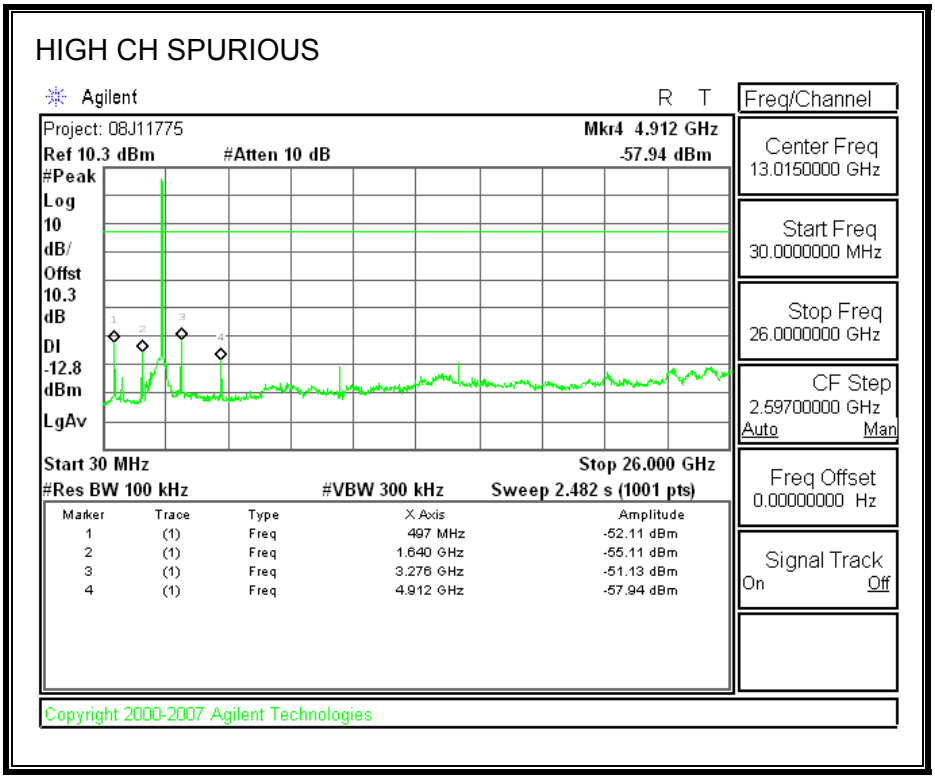
MID CH SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



7.2. 802.11g MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

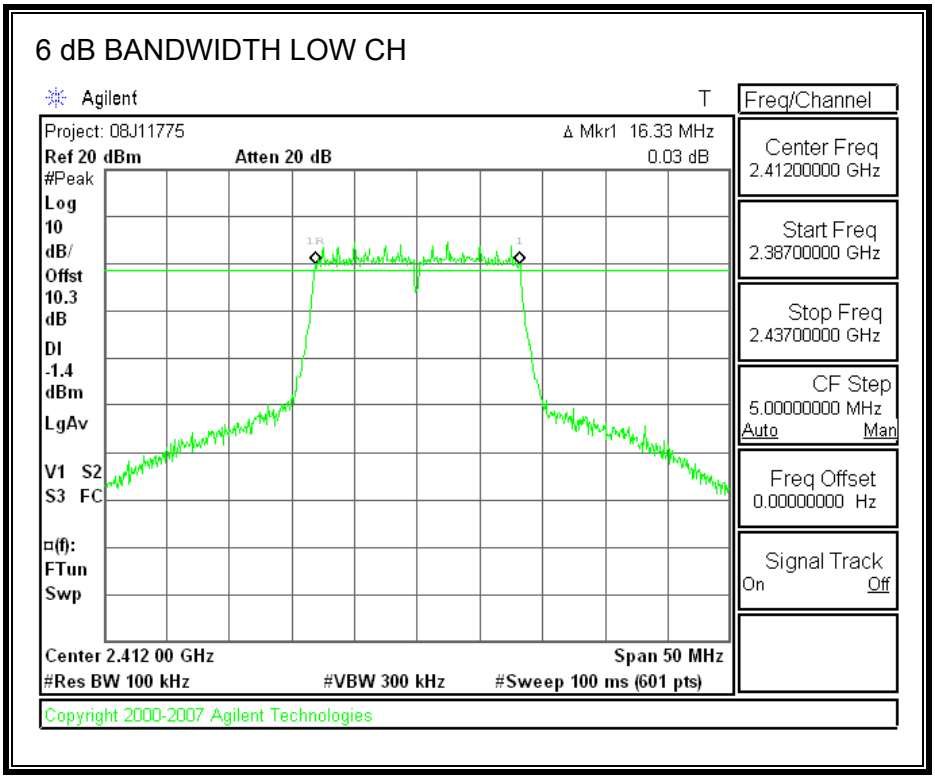
TEST PROCEDURE

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

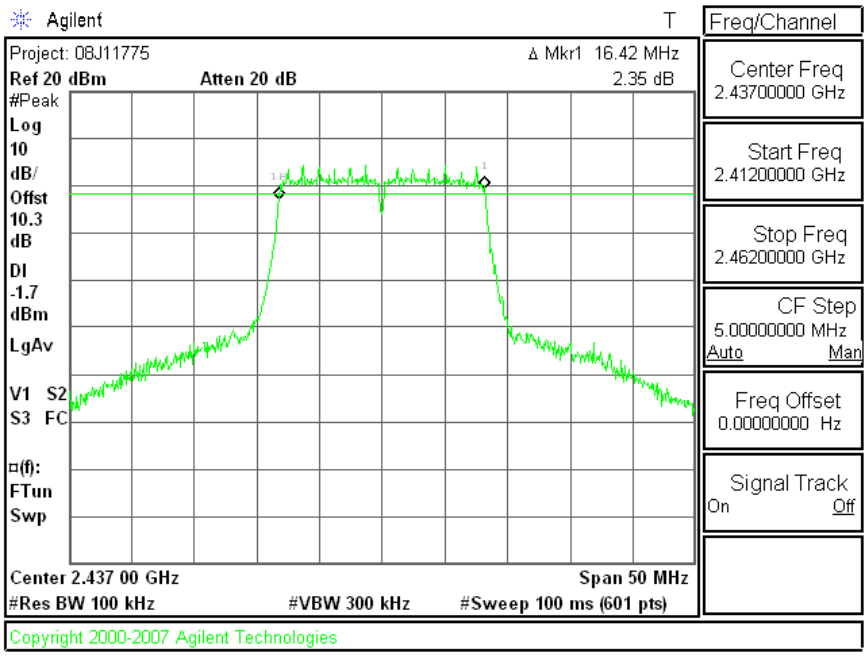
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.33	0.5
Middle	2437	16.42	0.5
High	2462	16.42	0.5

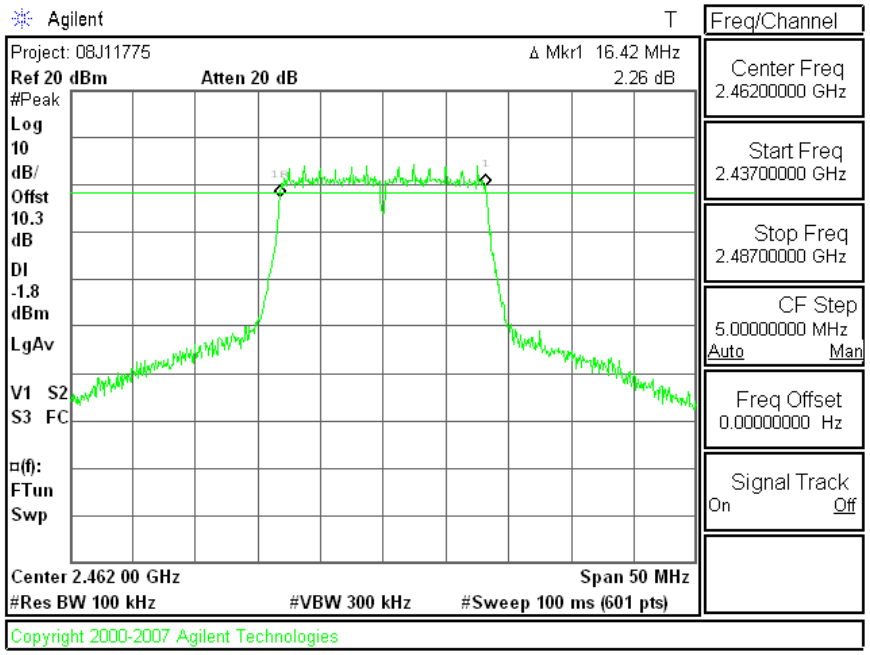
6 dB BANDWIDTH



6 dB BANDWIDTH MID CH



6 dB BANDWIDTH HIGH CH



7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

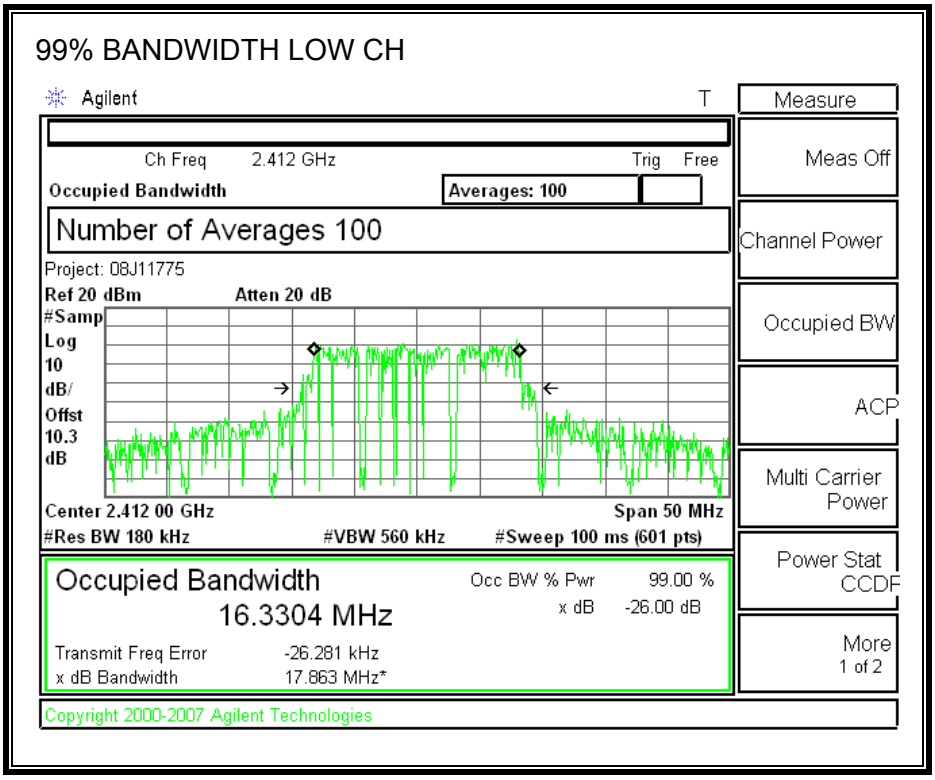
TEST PROCEDURE

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

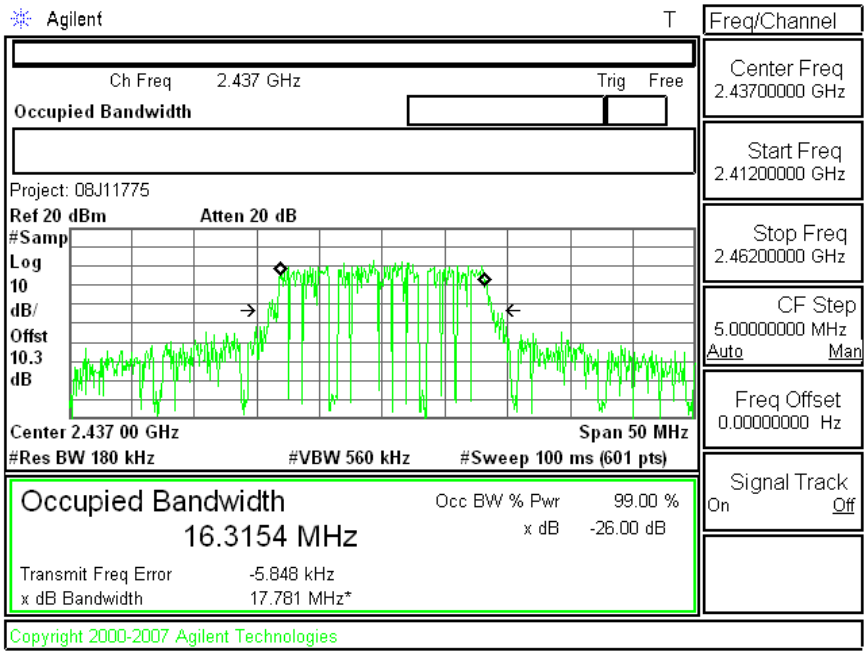
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.3304
Middle	2437	16.3154
High	2462	16.4379

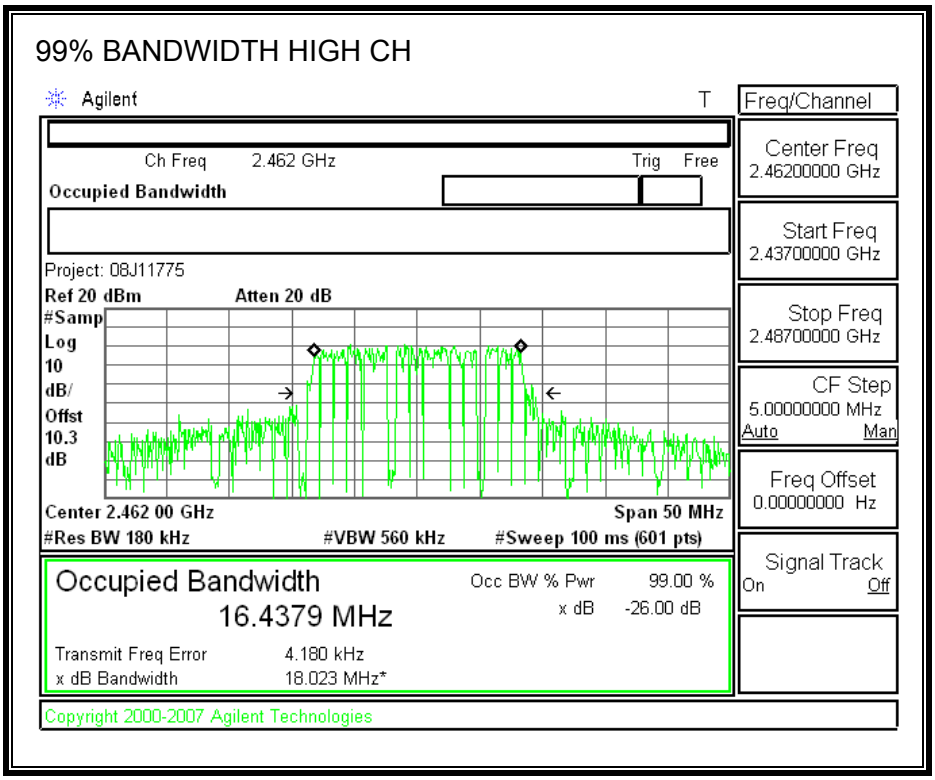
99% BANDWIDTH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



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.

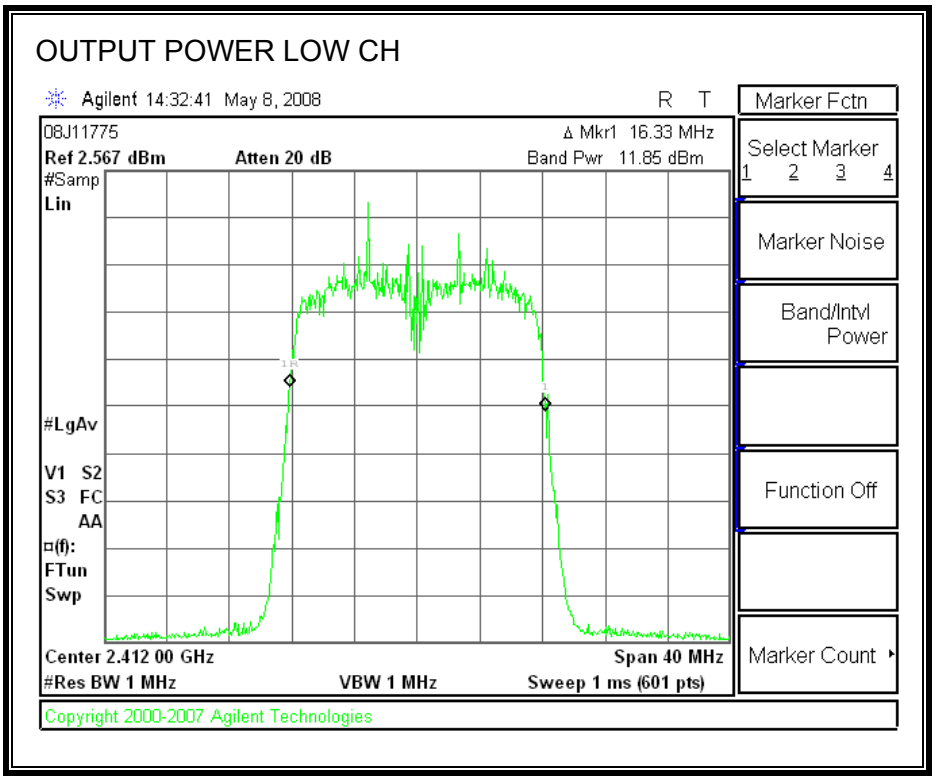
TEST PROCEDURE

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.

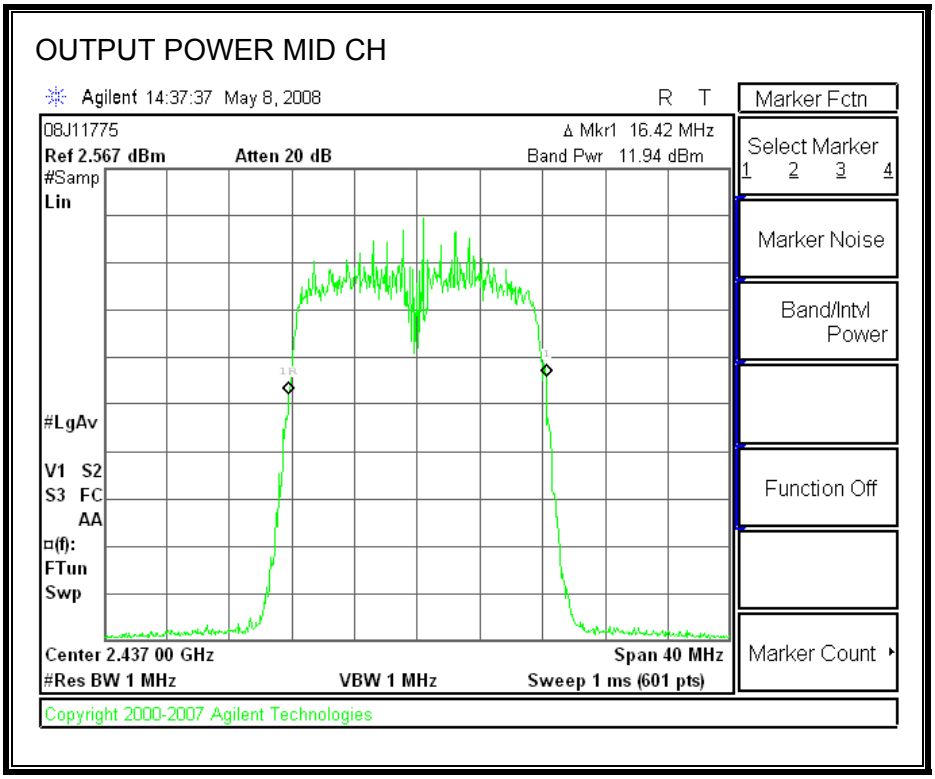
RESULTS

Channel	Frequency (MHz)	Spectrum Analyzer Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	11.85	10.3	22.15	30	-7.85
Middle	2437	11.94	10.3	22.24	30	-7.76
High	2462	12.28	10.3	22.58	30	-7.42

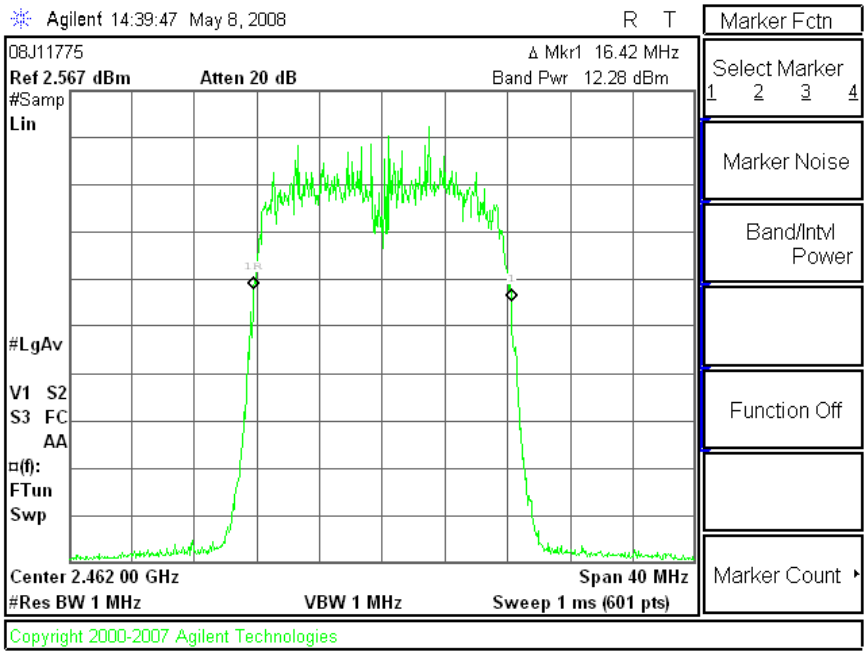
OUTPUT POWER



OUTPUT POWER MID CH



OUTPUT POWER HIGH CH



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 10.3 dB (including 10 dB pad and .3 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	15.34
Middle	2437	15.44
High	2462	15.24

7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

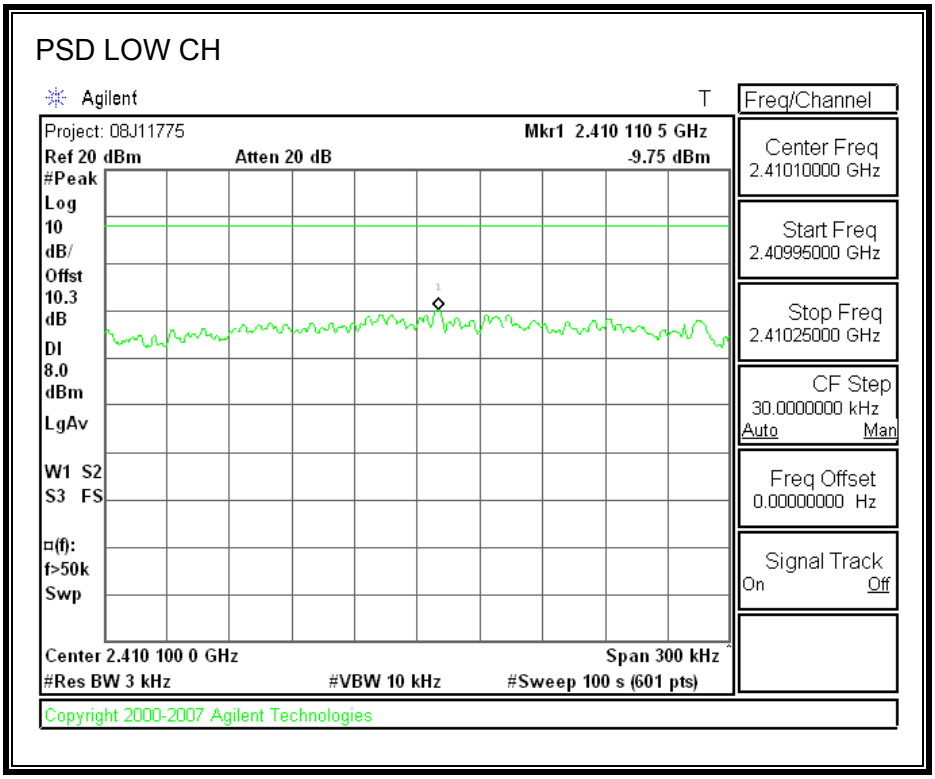
TEST PROCEDURE

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

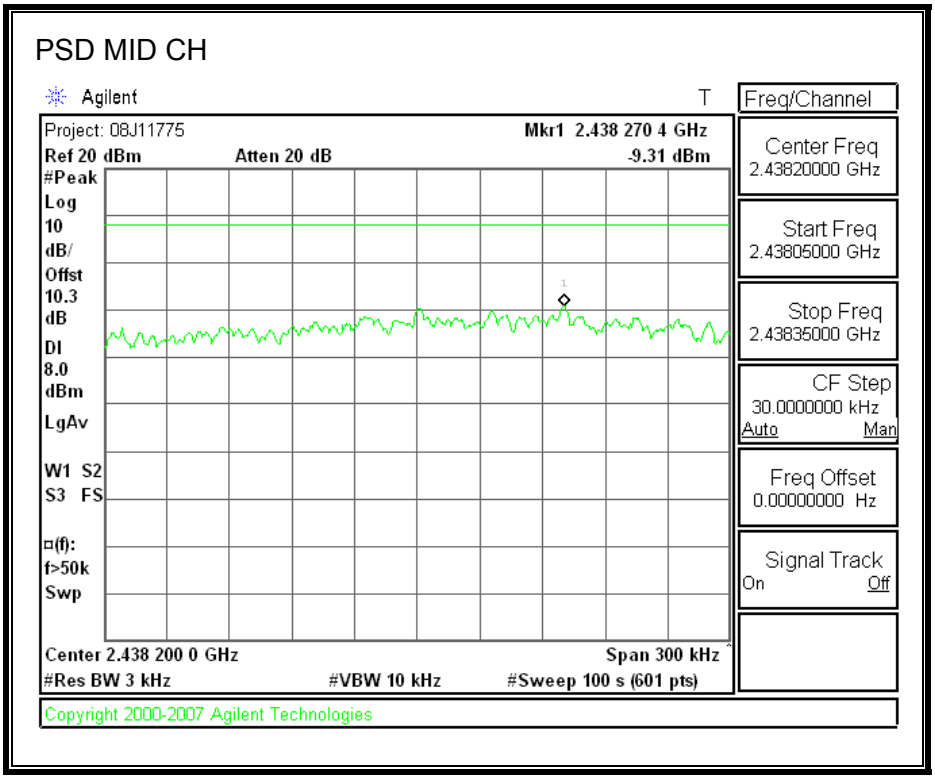
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.75	8	-17.75
Middle	2437	-9.31	8	-17.31
High	2462	-9.99	8	-17.99

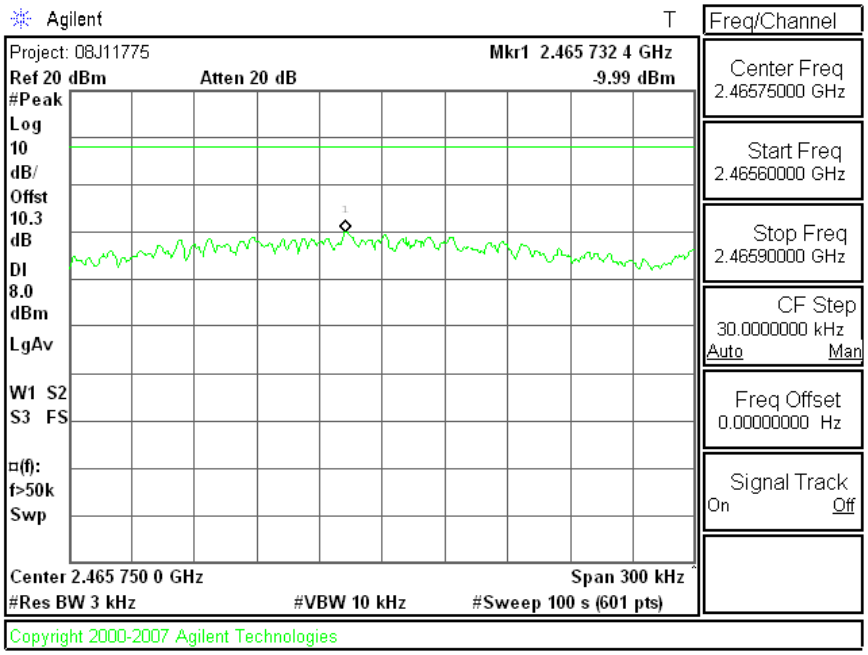
POWER SPECTRAL DENSITY



PSD MID CH



PSD HIGH CH



7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

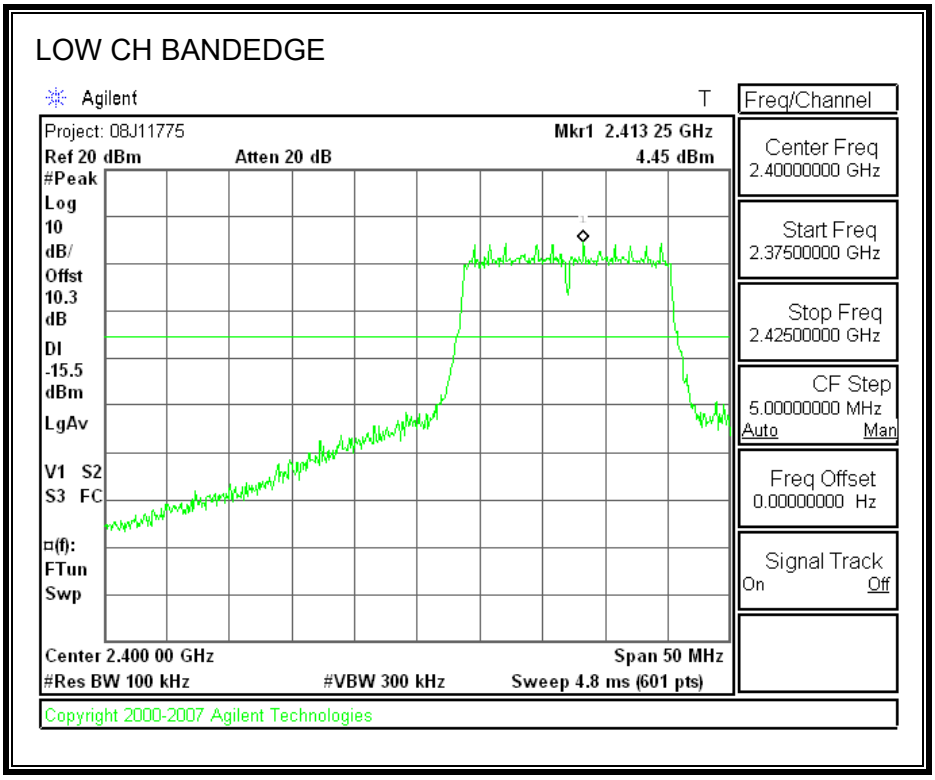
TEST PROCEDURE

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

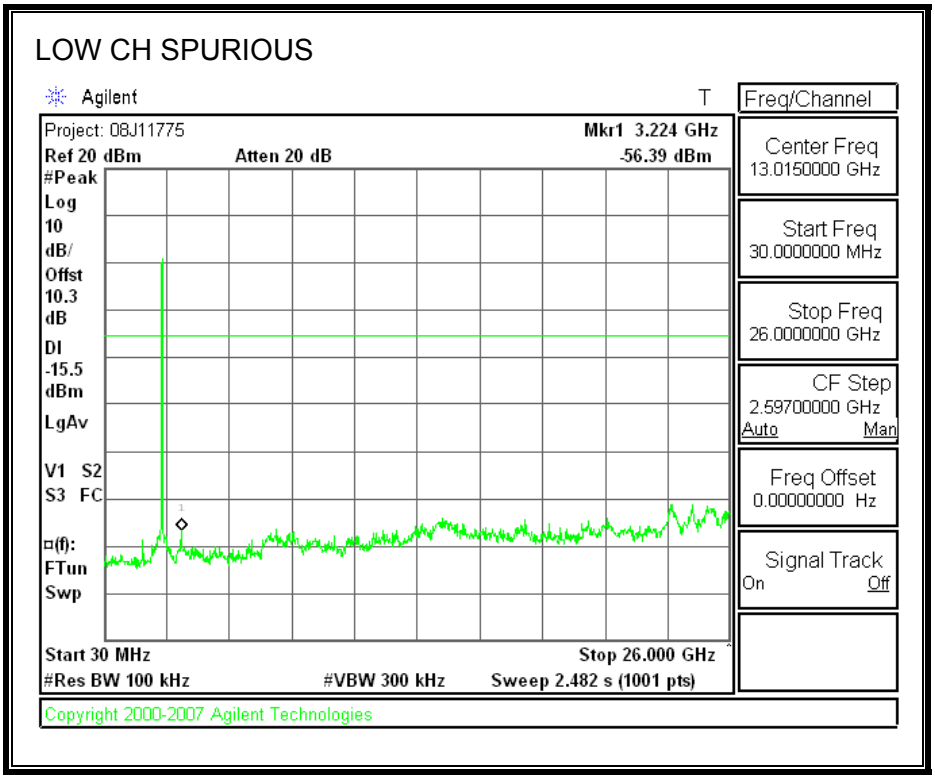
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

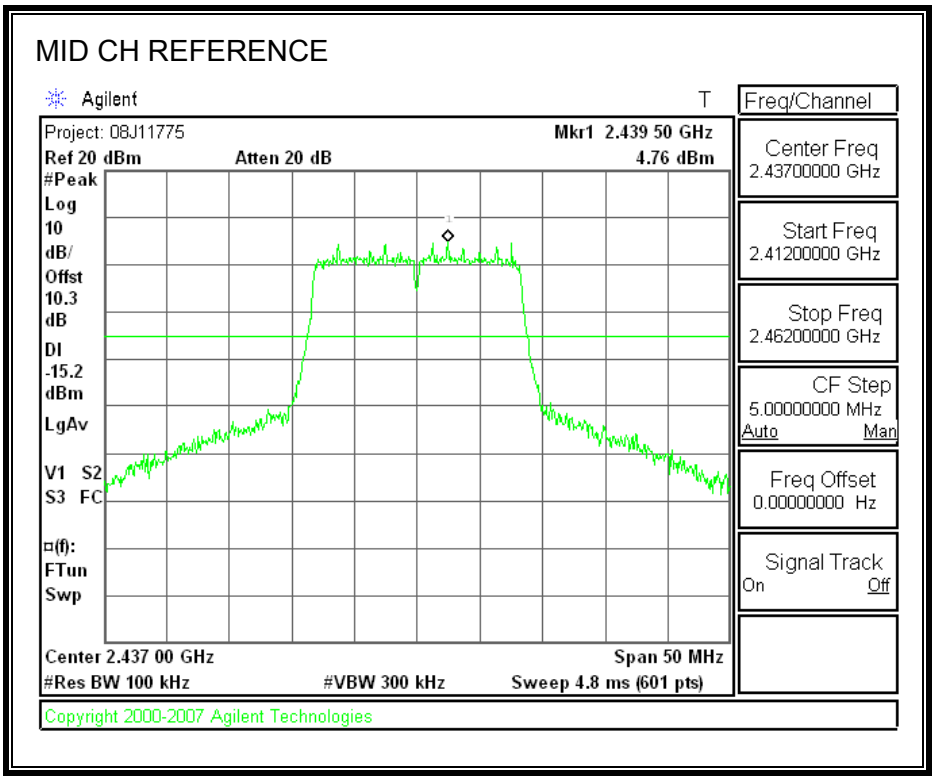
SPURIOUS EMISSIONS, LOW CHANNEL



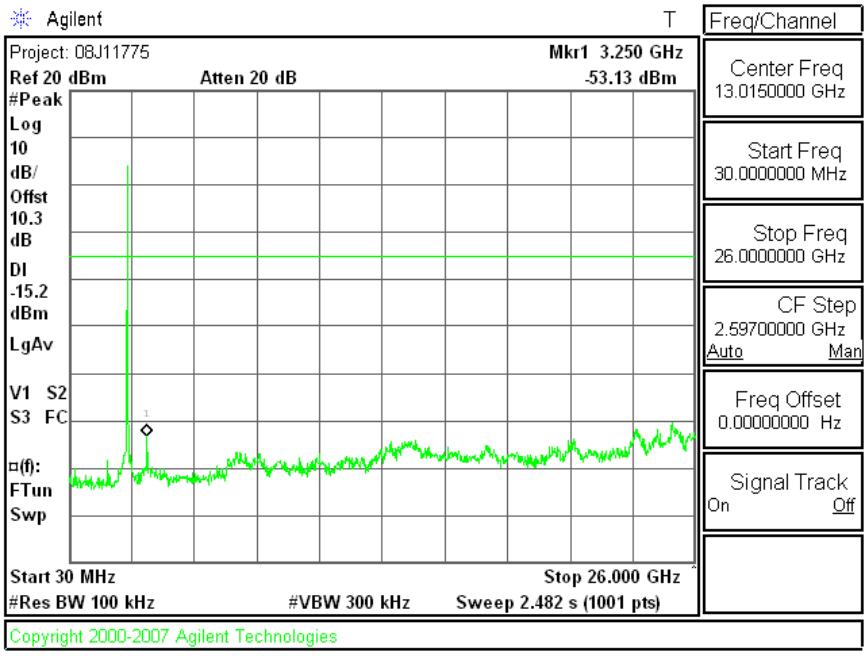
LOW CH SPURIOUS



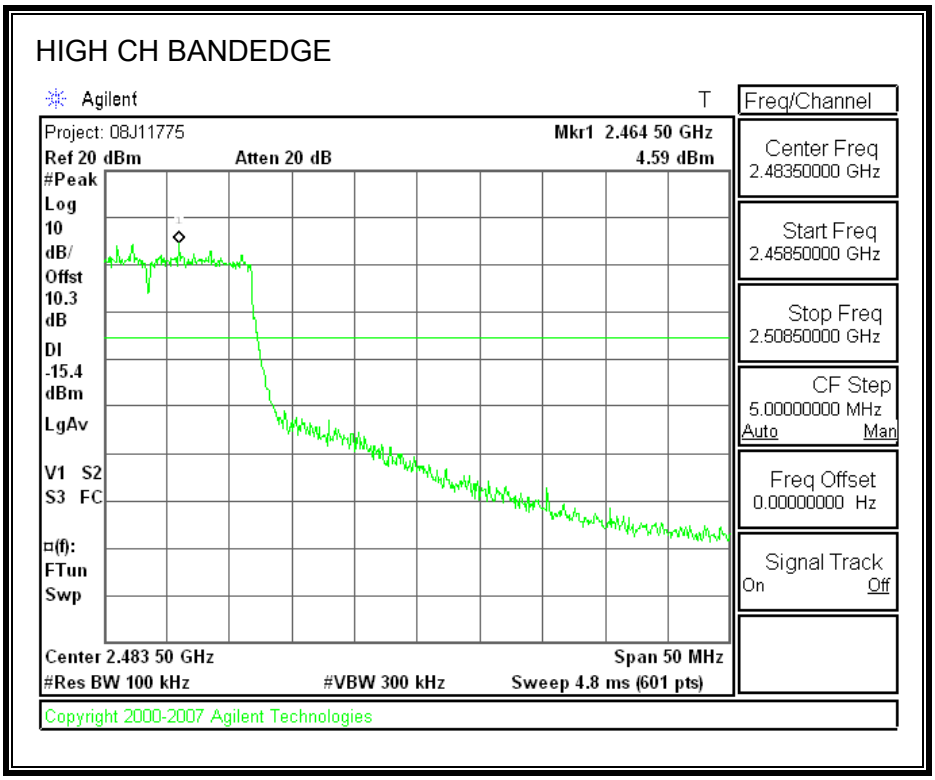
SPURIOUS EMISSIONS, MID CHANNEL



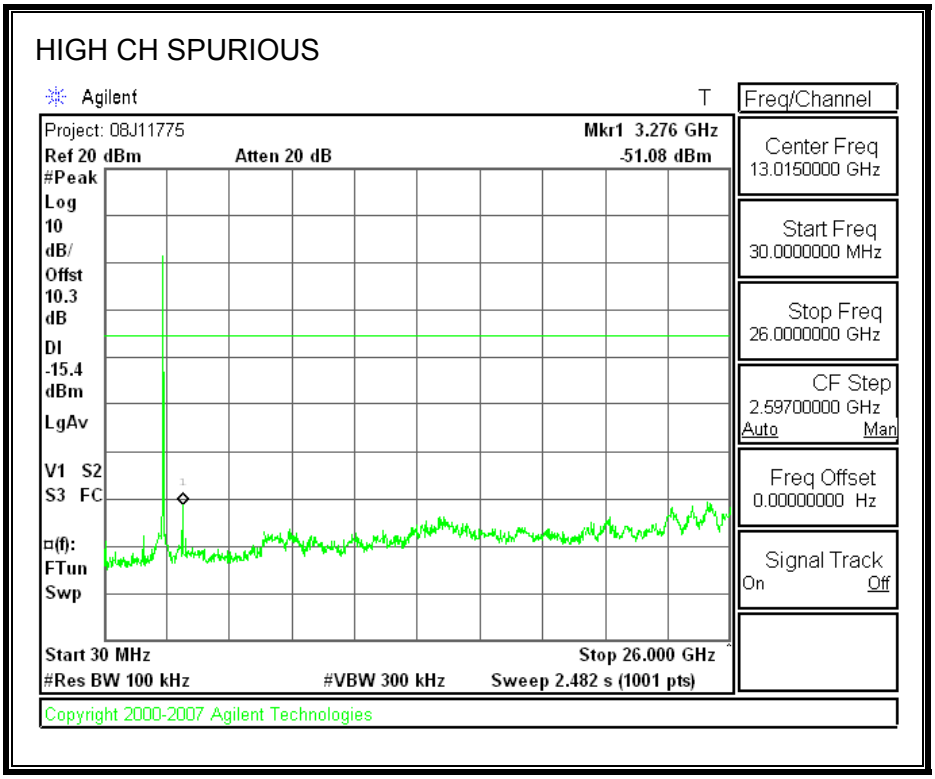
MID CH SPURIOUS



SPURIOUS EMISSIONS, HIGH CHANNEL



HIGH CH SPURIOUS



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

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

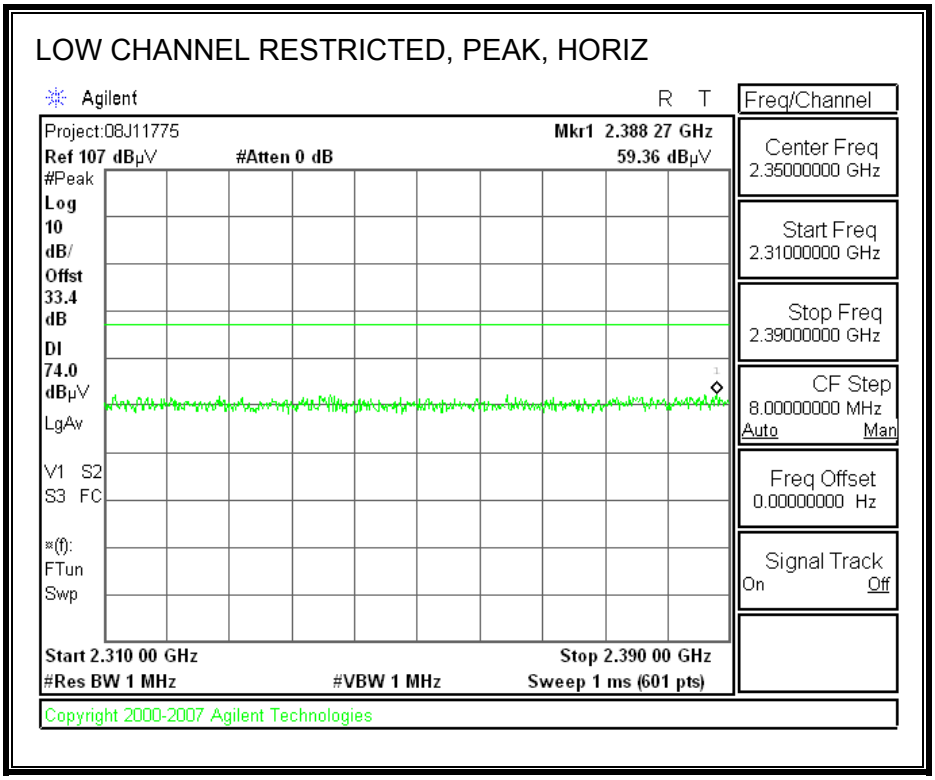
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

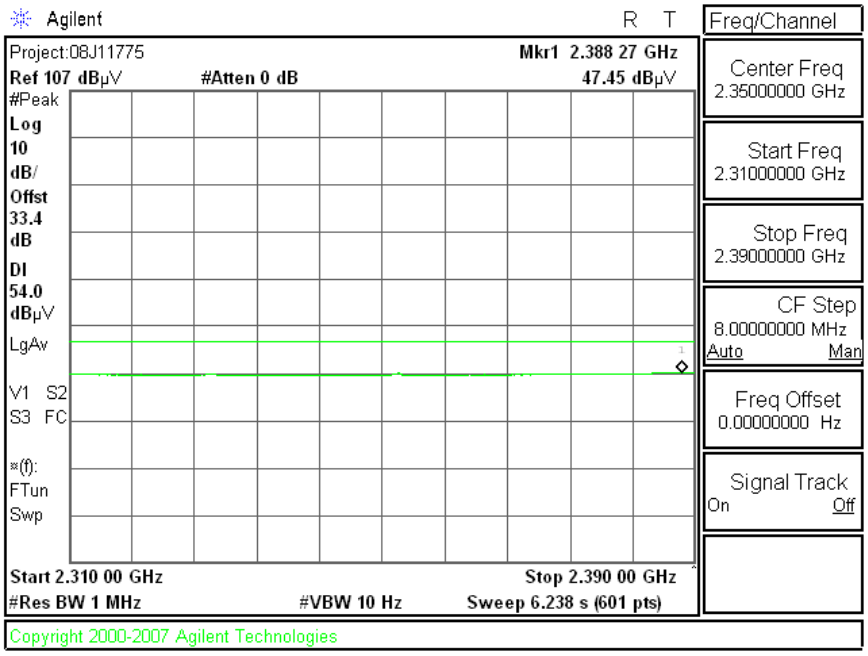
8.2.1. TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

CONFIGURATION 1:

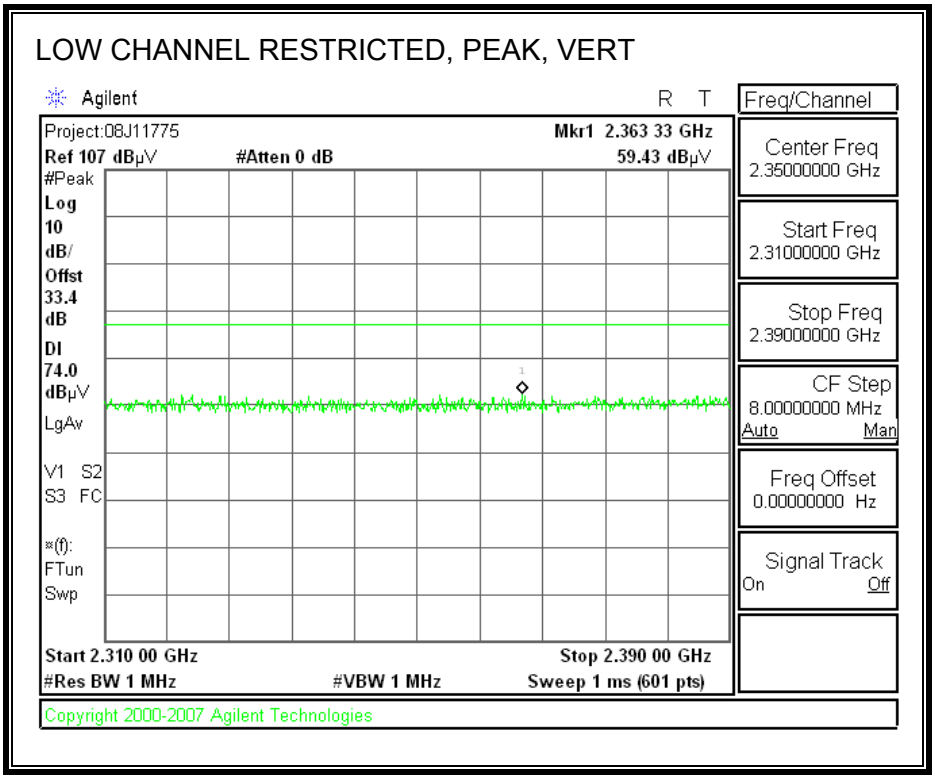
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



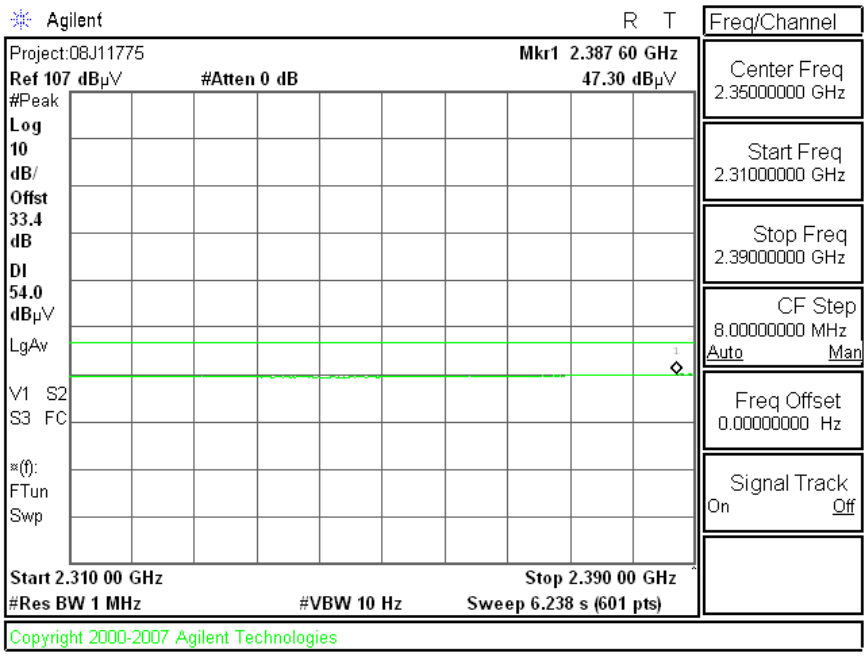
LOW CHANNEL RESTRICTED, AVG, HORIZ



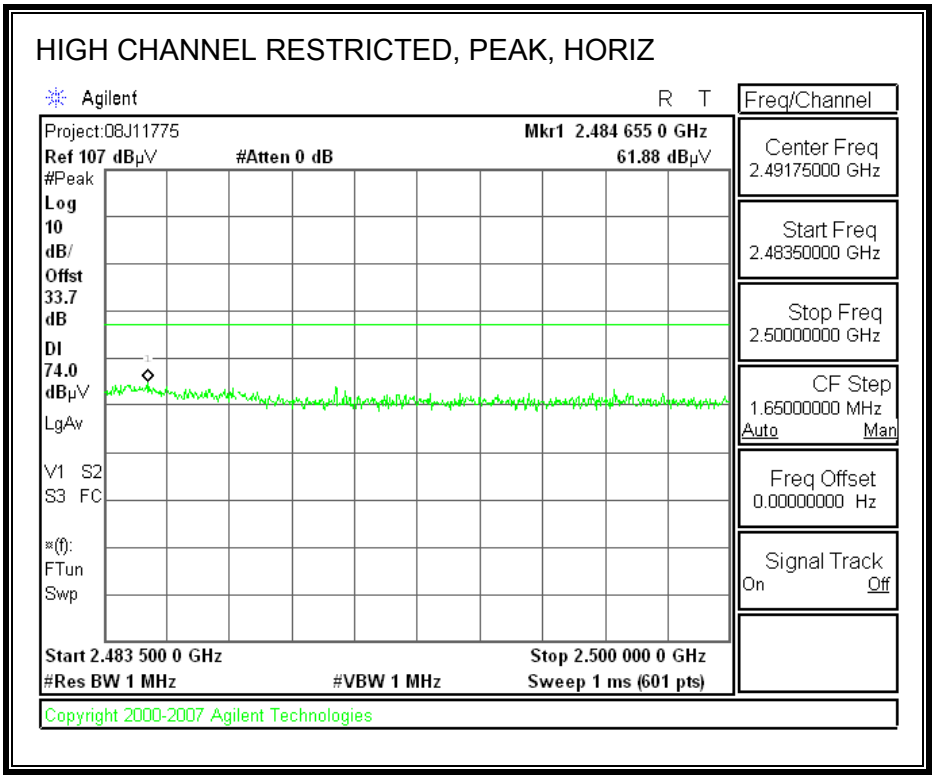
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



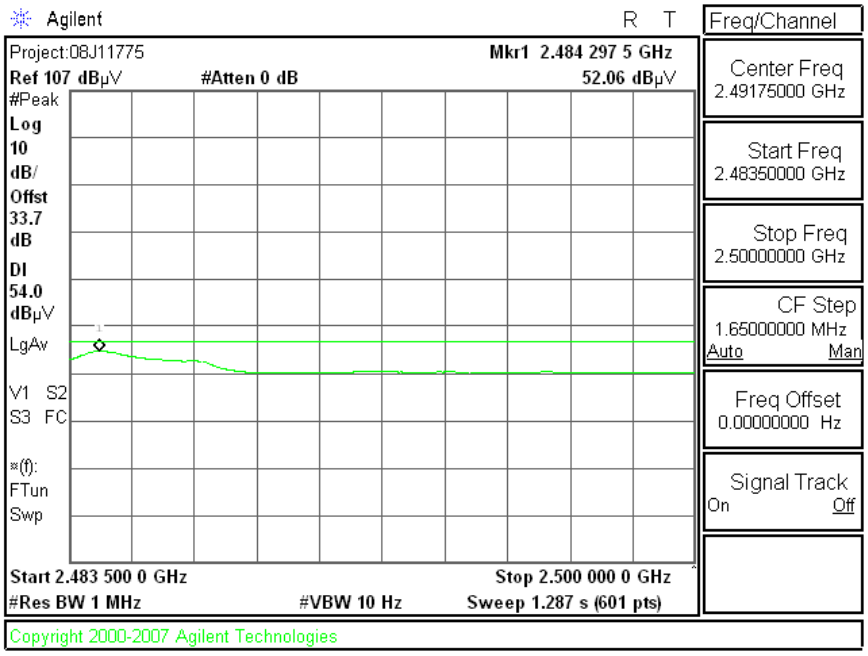
LOW CHANNEL RESTRICTED, AVG, VERT



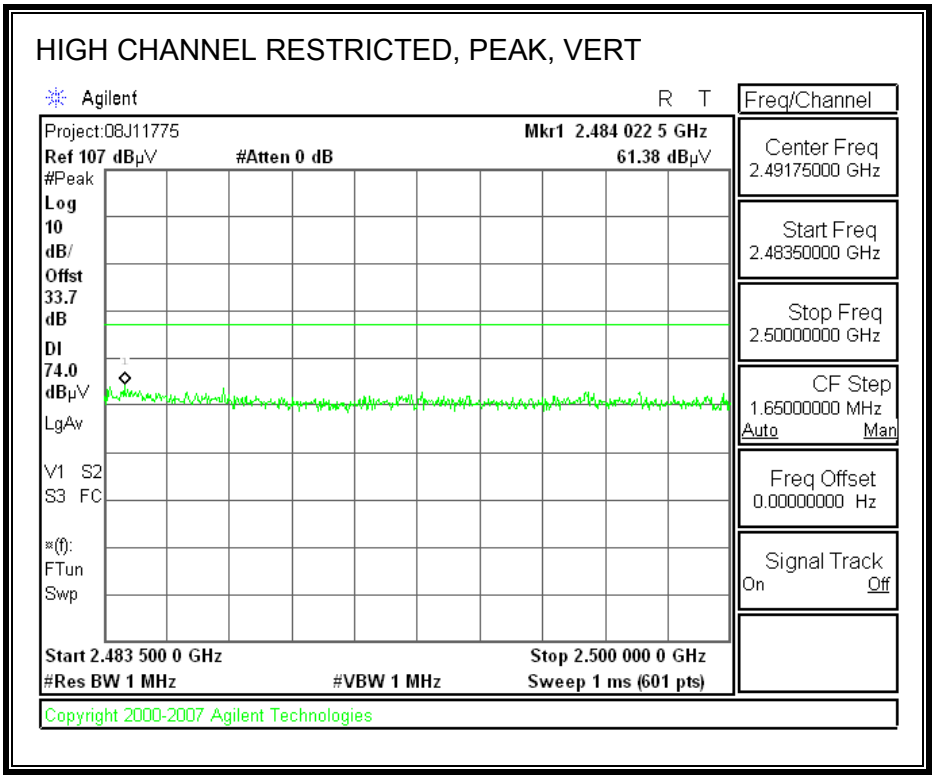
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



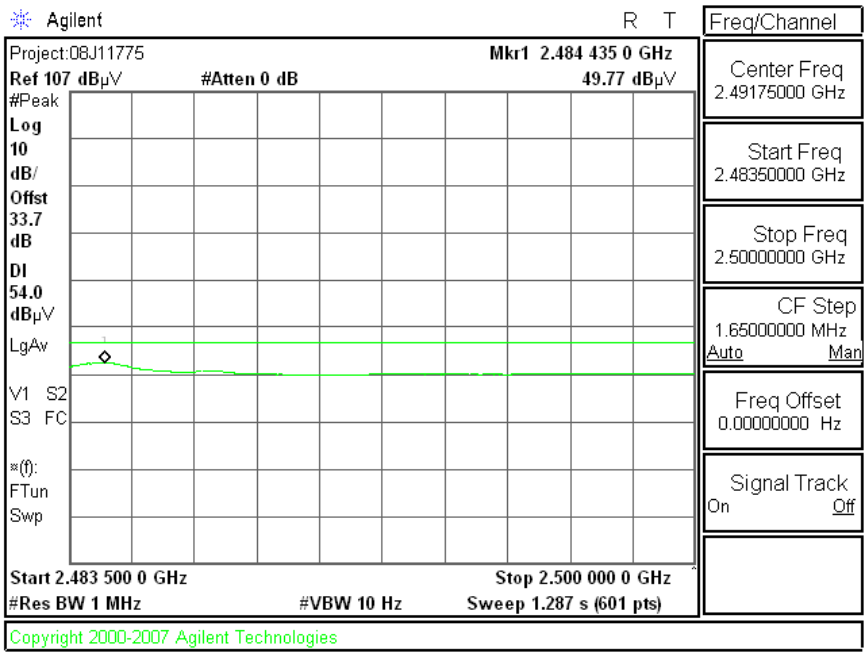
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: May 07, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Transmit b mode, Case 1

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T136; M/N: 3117 @3m	T145 Agilent 3008A005(		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Thanh 187215003	C-5m Chamber		R_001

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

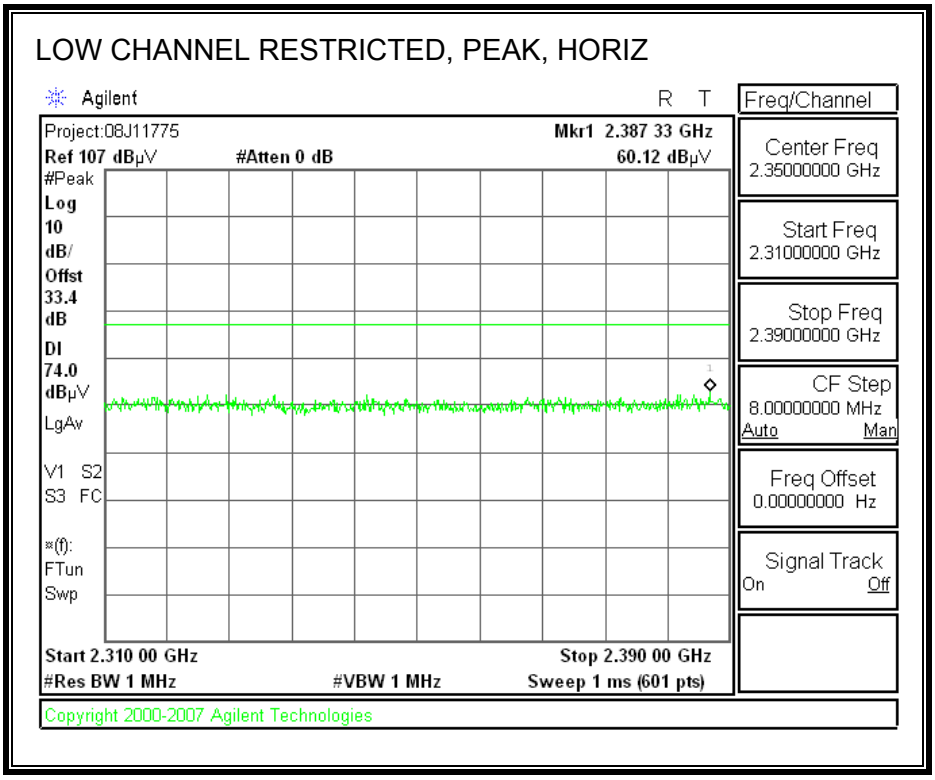
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low channel															
4.824	3.0	45.87	31.22	33.7	0.3	-34.8	0.0	0.0	45.1	30.4	74	54	-28.9	-23.6	V
12.060	3.0	42.56	30.06	37.5	0.7	-32.4	0.0	0.0	48.4	35.9	74	54	-25.6	-18.1	Noise floor
4.824	3.0	44.03	33.70	33.7	0.3	-34.8	0.0	0.0	43.2	32.9	74	54	-30.8	-21.1	H
12.060	3.0	45.11	38.05	37.5	0.7	-32.4	0.0	0.0	50.9	43.9	74	54	-23.1	-10.1	H
14.472	3.0	40.80	29.67	38.4	1.1	-32.4	0.0	0.0	47.8	36.7	74	54	-26.2	-17.3	Noise floor
Mid Channel															
4.874	3.0	42.59	33.19	33.7	0.4	-34.9	0.0	0.0	41.9	32.5	74	54	-32.1	-21.5	H
7.311	3.0	46.78	30.20	35.2	0.9	-34.7	0.0	0.0	48.3	31.7	74	54	-25.7	-22.3	H
12.185	3.0	45.38	39.20	37.5	0.7	-32.4	0.0	0.0	51.2	45.1	74	54	-22.8	-8.9	H
4.874	3.0	43.36	31.86	33.7	0.4	-34.9	0.0	0.0	42.6	31.1	74	54	-31.4	-22.9	V
7.311	3.0	44.08	30.20	35.2	0.9	-34.7	0.0	0.0	45.6	31.7	74	54	-28.4	-22.3	V
12.185	3.0	44.22	35.48	37.5	0.7	-32.4	0.0	0.0	50.1	41.3	74	54	-23.9	-12.7	V
High channel															
4.924	3.0	42.93	30.97	33.8	0.4	-34.9	0.0	0.0	42.3	30.3	74	54	-31.7	-23.7	V
7.386	3.0	42.32	30.50	35.3	0.9	-34.6	0.0	0.0	43.8	32.0	74	54	-30.2	-22.0	V
12.310	3.0	43.30	32.01	37.5	0.7	-32.4	0.0	0.0	49.2	37.9	74	54	-24.8	-16.1	Noise floor
4.924	3.0	44.76	35.21	33.8	0.4	-34.9	0.0	0.0	44.1	34.5	74	54	-29.9	-19.5	H
7.386	3.0	43.49	30.52	35.3	0.9	-34.6	0.0	0.0	45.0	32.0	74	54	-29.0	-22.0	H
12.310	3.0	43.44	35.31	37.5	0.7	-32.4	0.0	0.0	49.3	41.2	74	54	-24.7	-12.8	H
No other emission above noise floor.															

Rev. 4.12.7

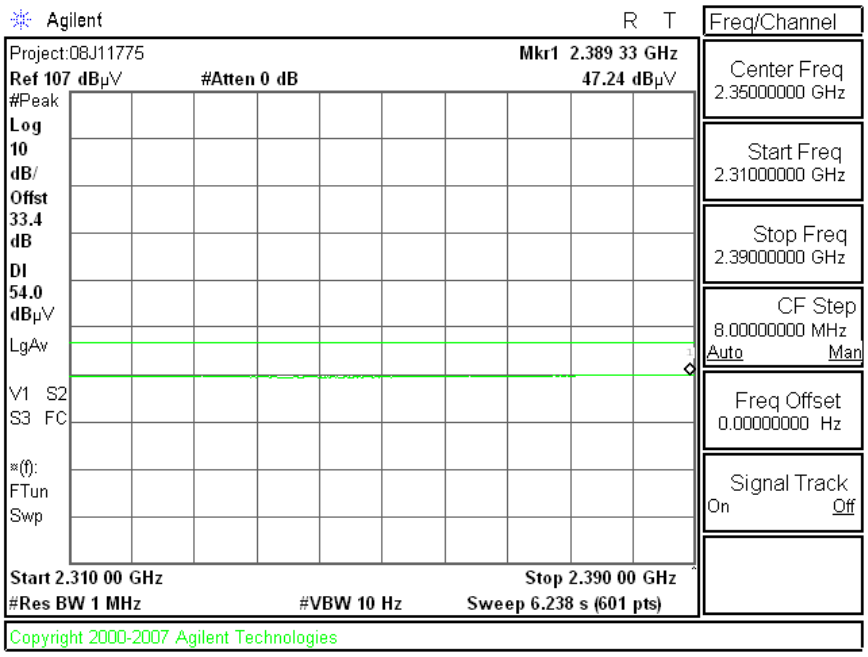
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

CONFIGURATION 2:

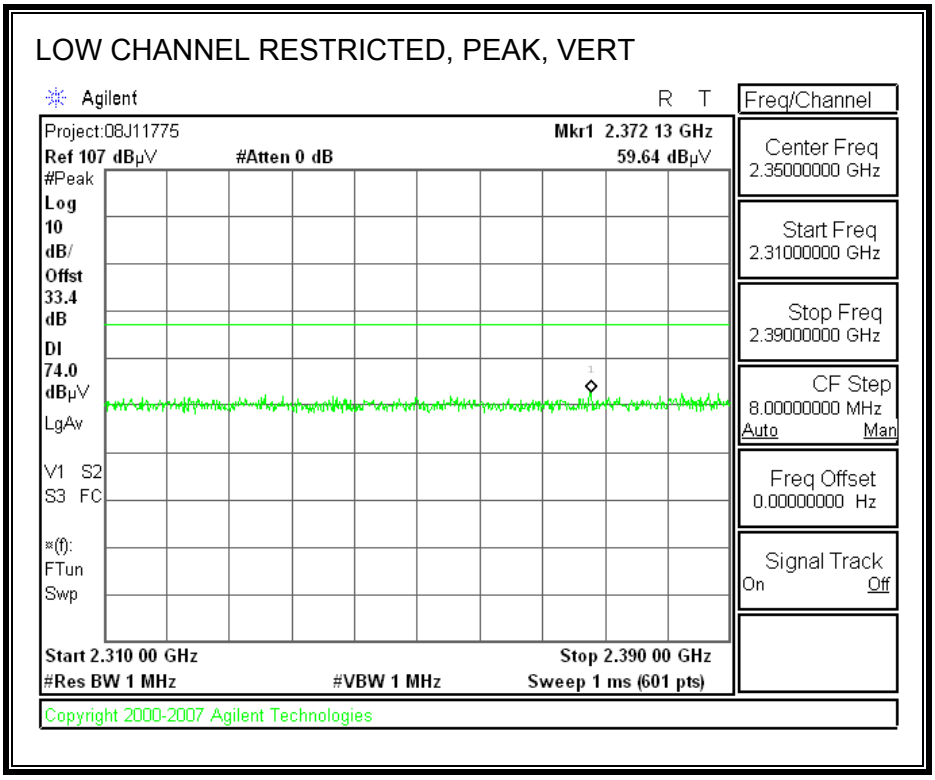
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



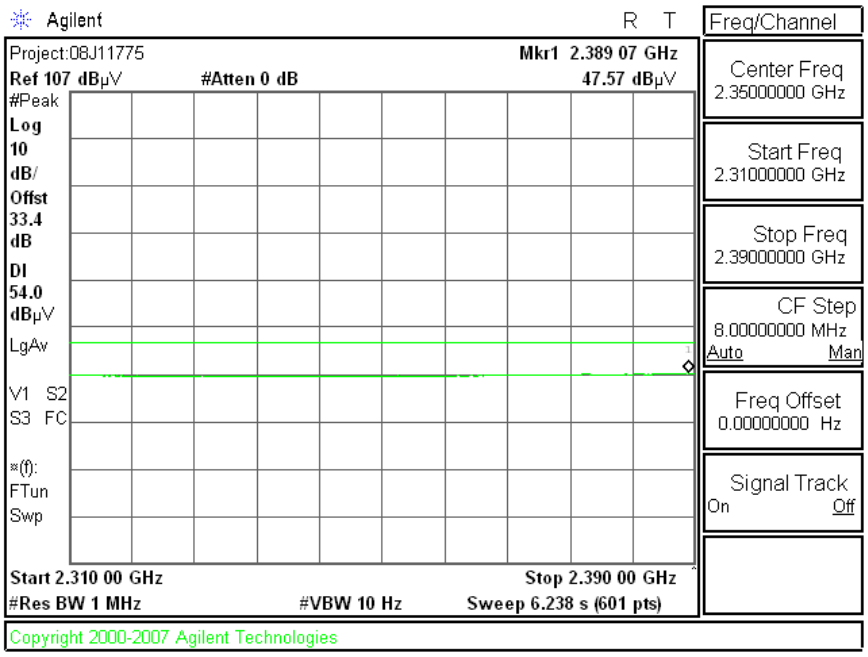
LOW CHANNEL RESTRICTED, AVG, HORIZ



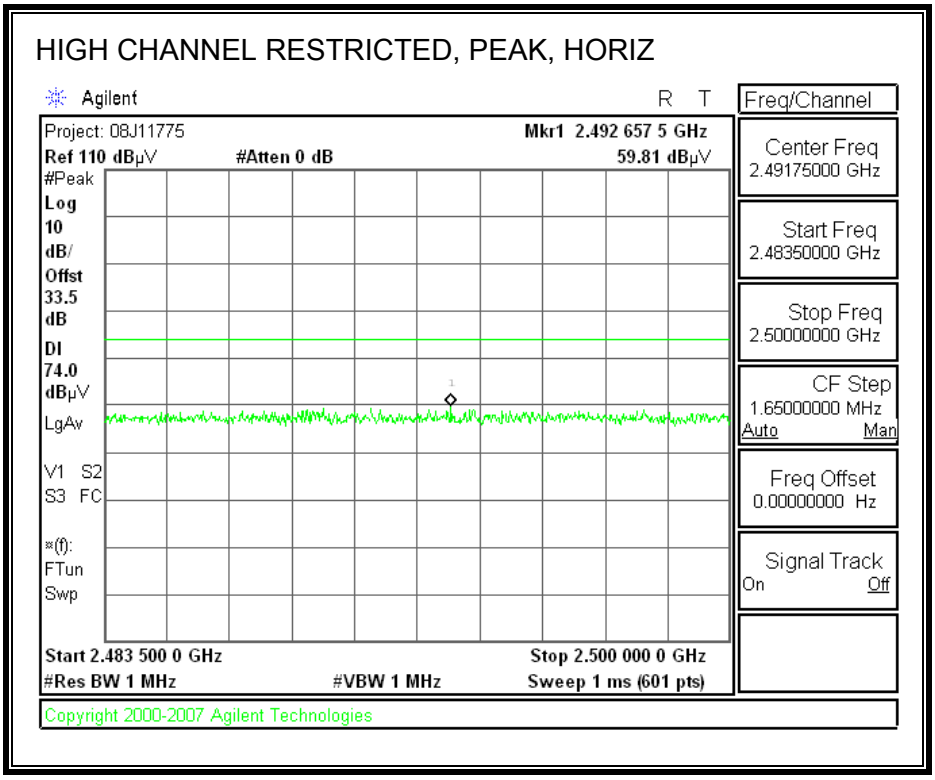
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



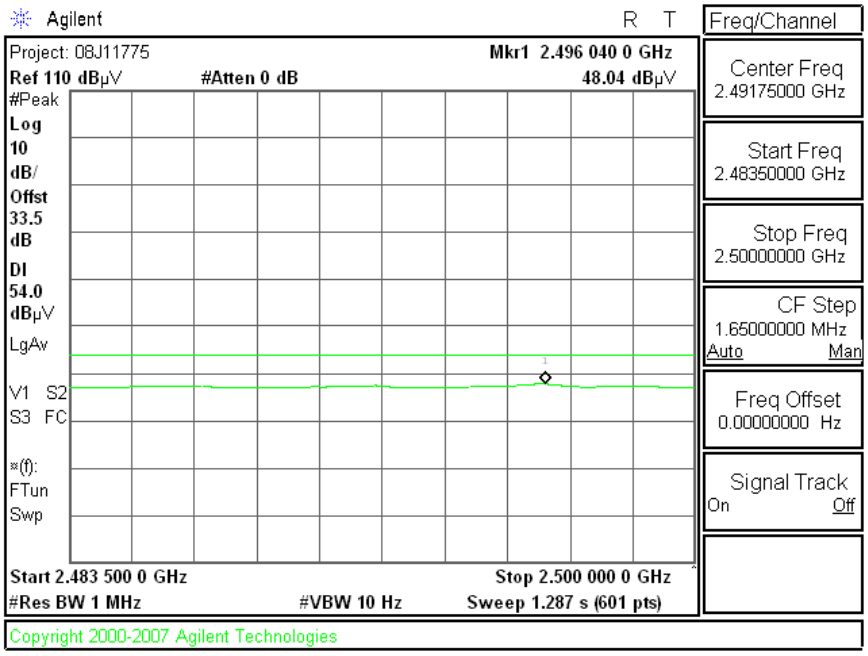
LOW CHANNEL RESTRICTED, AVG, VERT



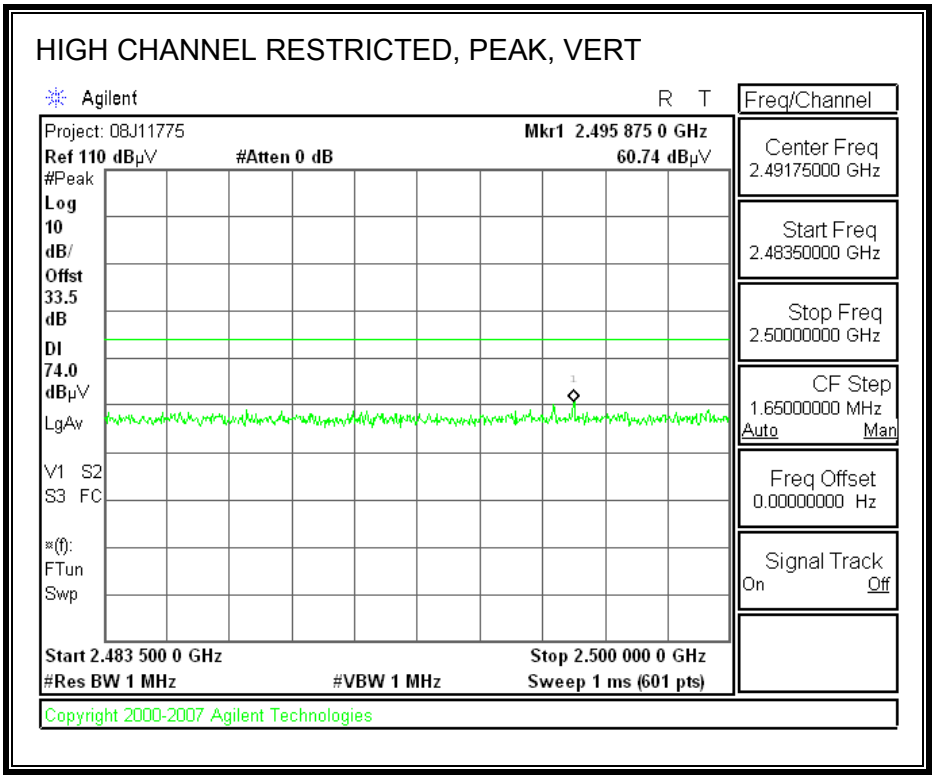
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



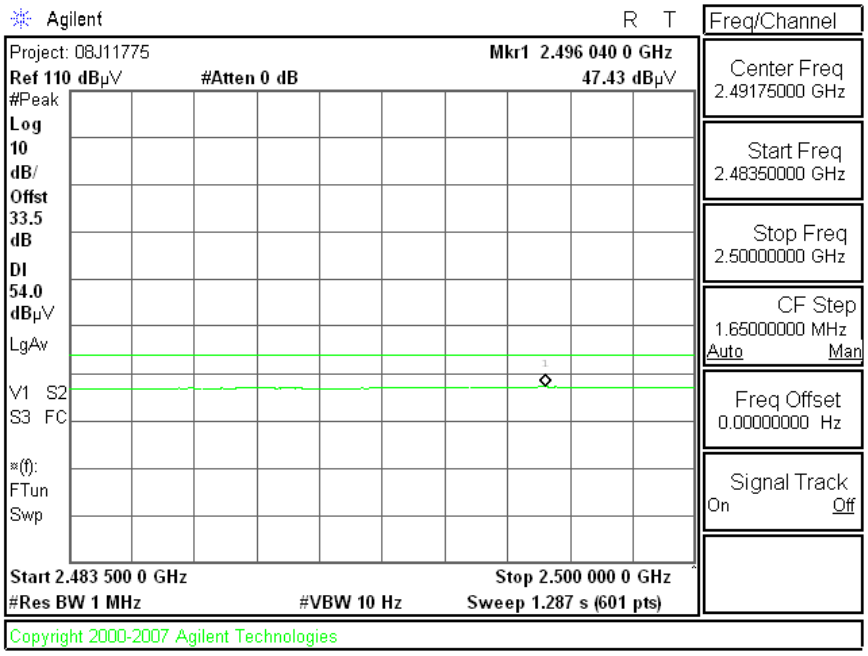
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: May 07, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Transmit b mode, Case 2

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T136; M/N: 3117 @3m	T145 Agilent 3008A005(		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Thanh 187215003	C-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 channel															
4.824	3.0	44.10	30.85	33.7	0.3	-34.8	0.0	0.0	43.3	30.1	74	54	-30.7	-23.9	V
12.060	3.0	42.52	29.84	37.5	0.7	-32.4	0.0	0.0	48.3	35.7	74	54	-25.7	-18.3	V
14.472	3.0	41.20	30.21	38.4	1.1	-32.4	0.0	0.0	48.2	37.3	74	54	-25.8	-16.7	V
4.824	3.0	44.65	34.88	33.7	0.3	-34.8	0.0	0.0	43.9	34.1	74	54	-30.1	-19.9	H
12.060	3.0	46.95	40.57	37.5	0.7	-32.4	0.0	0.0	52.8	46.4	74	54	-21.2	-7.6	H
14.472	3.0	42.29	31.99	38.4	1.1	-32.4	0.0	0.0	49.3	39.0	74	54	-24.7	-15.0	H
Mid Channel															
4.874	3.0	44.86	36.27	33.7	0.4	-34.9	0.0	0.0	44.1	35.5	74	54	-29.9	-18.5	H
7.311	3.0	46.78	30.20	35.2	0.9	-34.7	0.0	0.0	48.3	31.7	74	54	-25.7	-22.3	H
12.185	3.0	46.71	34.78	37.5	0.7	-32.4	0.0	0.0	52.6	40.6	74	54	-21.4	-13.4	H
4.874	3.0	43.70	33.21	33.7	0.4	-34.9	0.0	0.0	43.0	32.5	74	54	-31.0	-21.5	V
7.311	3.0	44.14	30.32	35.2	0.9	-34.7	0.0	0.0	45.6	31.8	74	54	-28.4	-22.2	V
12.185	3.0	45.27	34.22	37.5	0.7	-32.4	0.0	0.0	51.1	40.1	74	54	-22.9	-13.9	V
High channel															
4.924	3.0	43.78	31.44	33.8	0.4	-34.9	0.0	0.0	43.1	30.8	74	54	-30.9	-23.2	V
7.386	3.0	43.56	30.46	35.3	0.9	-34.6	0.0	0.0	45.1	32.0	74	54	-28.9	-22.0	V
12.310	3.0	44.33	32.57	37.5	0.7	-32.4	0.0	0.0	50.2	38.4	74	54	-23.8	-15.6	V
4.924	3.0	45.91	38.01	33.8	0.4	-34.9	0.0	0.0	45.2	37.3	74	54	-28.8	-16.7	H
7.386	3.0	43.67	31.27	35.3	0.9	-34.6	0.0	0.0	45.2	32.8	74	54	-28.8	-21.2	H
12.310	3.0	44.76	37.23	37.5	0.7	-32.4	0.0	0.0	50.6	43.1	74	54	-23.4	-10.9	H
No other emission above noise floor.															

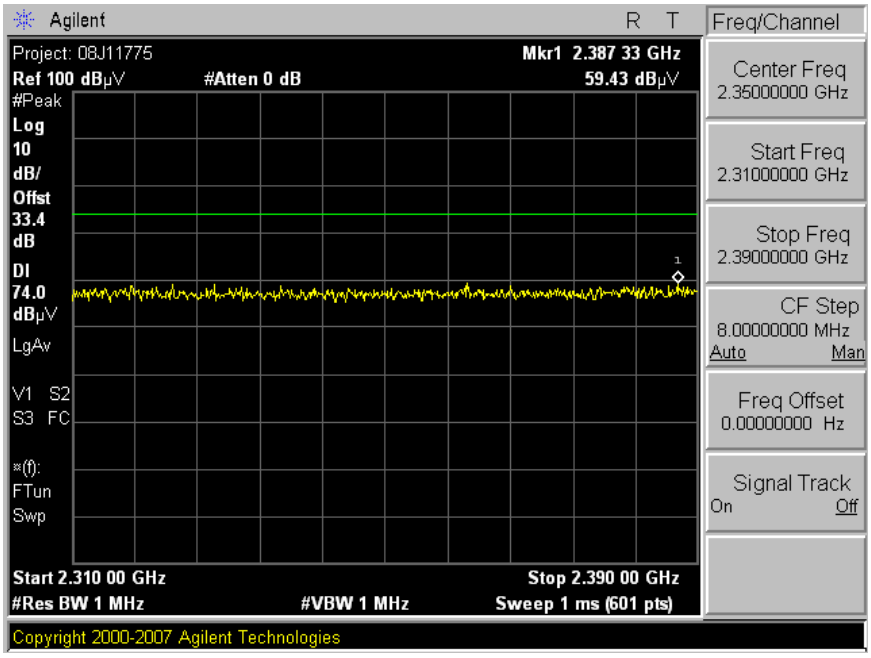
Rev. 4.12.7

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		

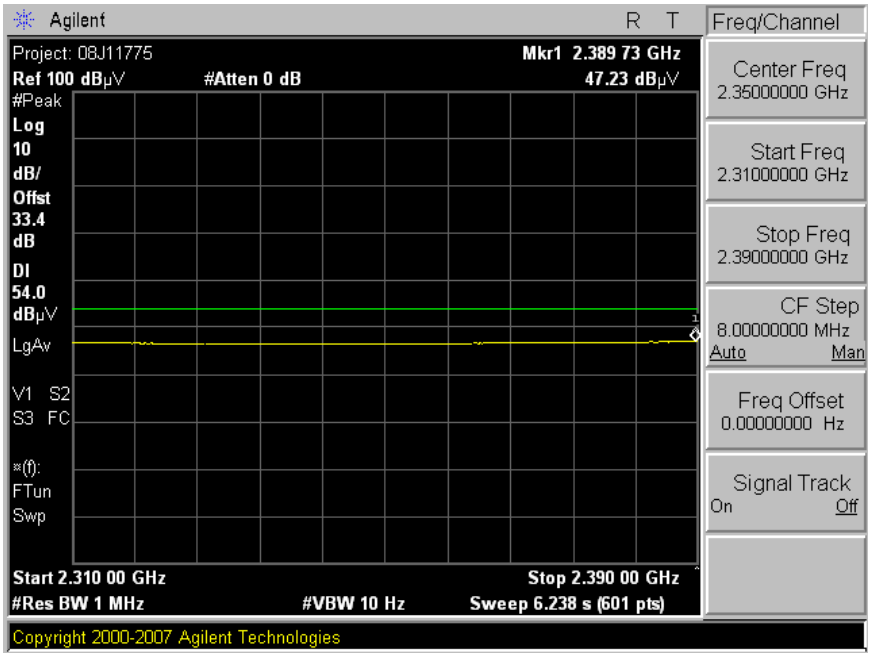
CONFIGURATION 3:

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CHANNEL RESTRICTED, PEAK, HORIZ

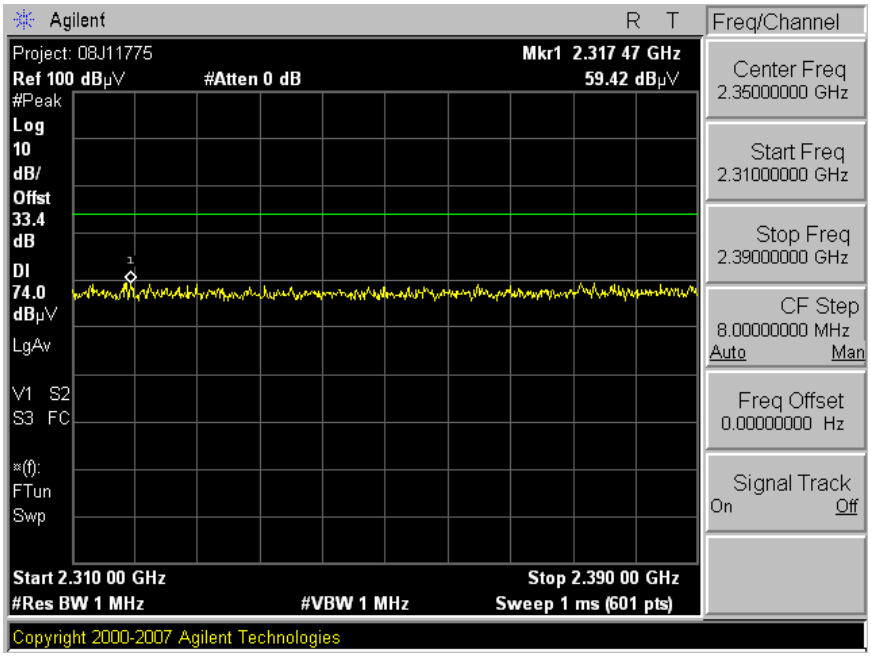


LOW CHANNEL RESTRICTED, AVG, HORIZ

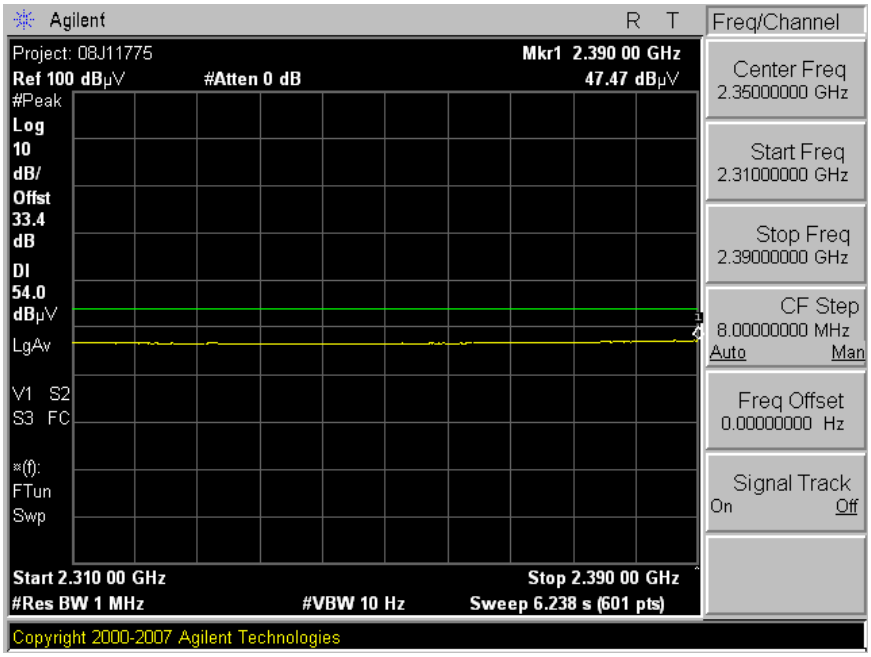


RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CHANNEL RESTRICTED, PEAK, VERT

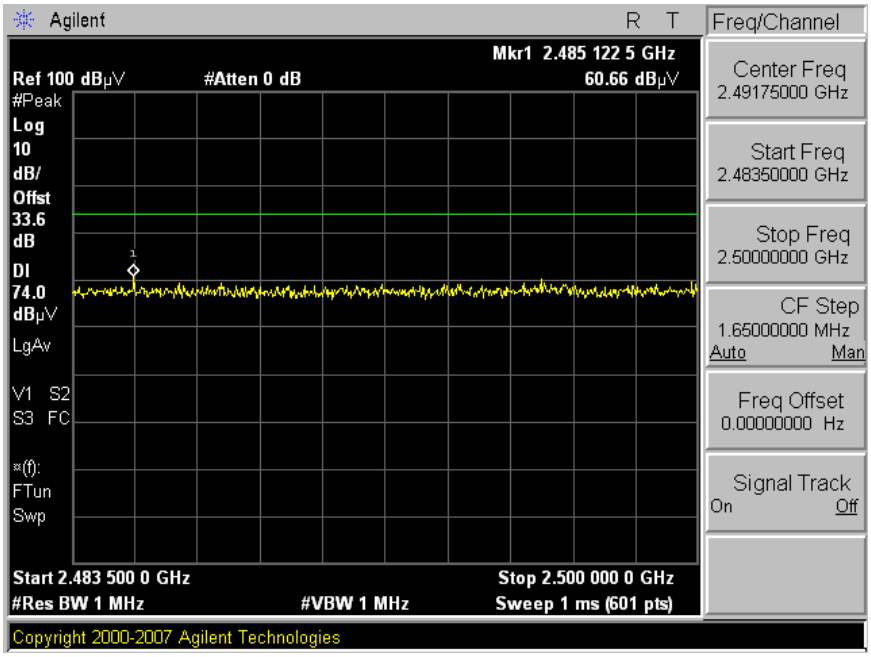


LOW CHANNEL RESTRICTED, AVG, VERT

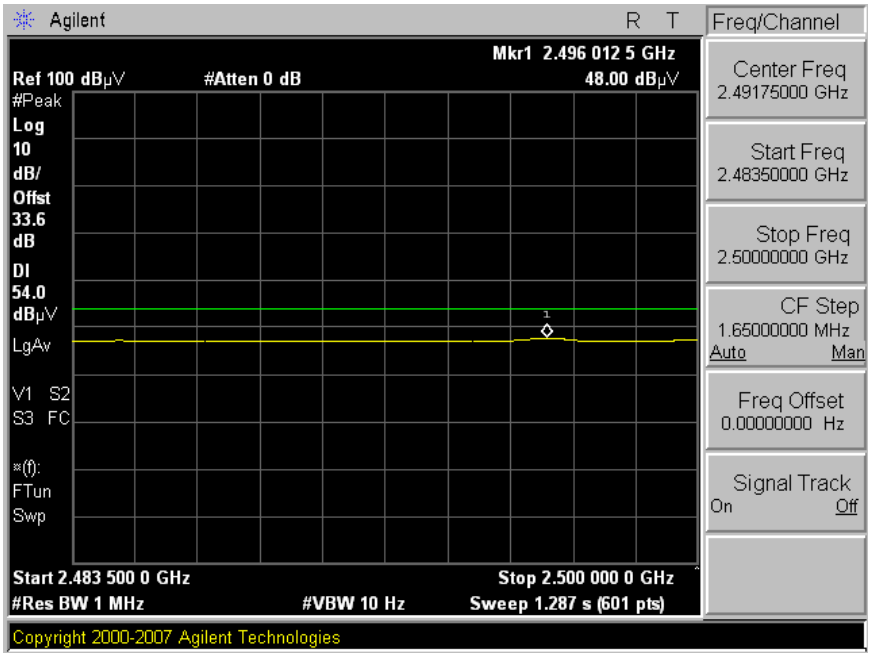


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

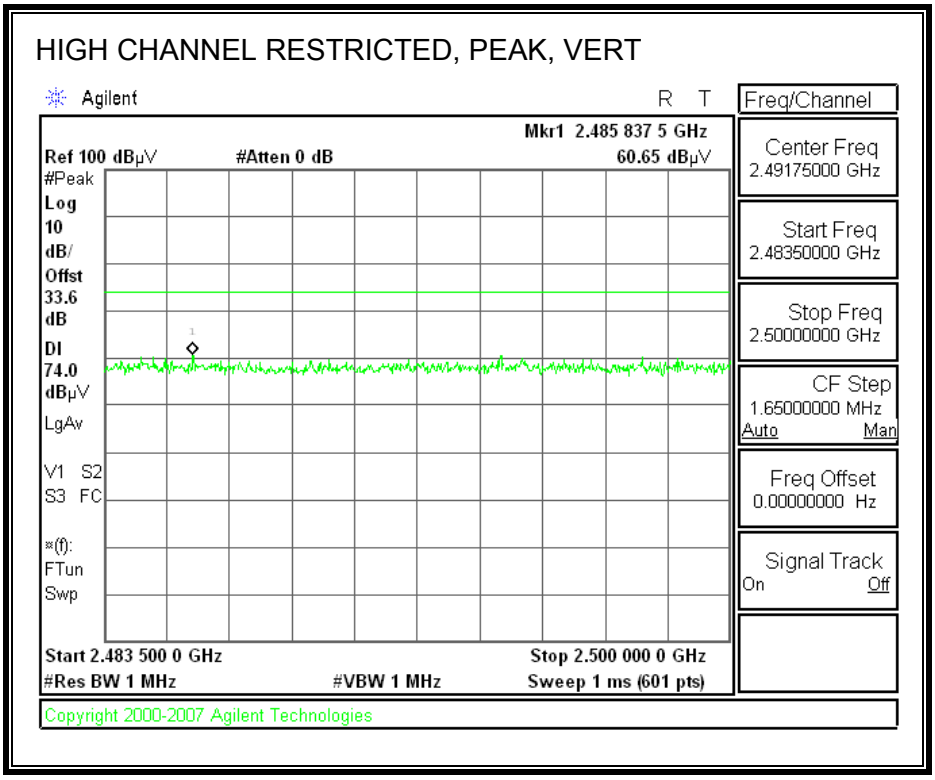
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



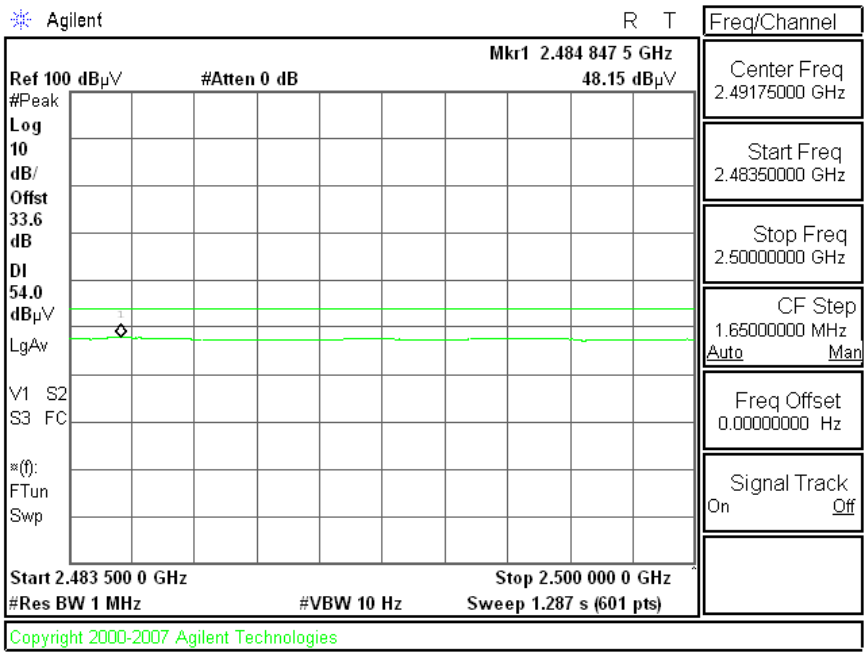
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: 5/7/2008
Test Engineer: Mengistu Mekuria
Configuration: EUT and support equipment.
Mode: Transmit b mode, Case 3

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	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 channel															
4.824	3.0	43.33	31.25	33.3	7.1	-34.8	0.0	0.0	48.9	36.8	74	54	-25.1	-17.2	V
12.060	3.0	43.59	33.71	37.7	12.4	-32.5	0.0	0.0	61.1	51.3	74	54	-12.9	-2.7	V
4.824	3.0	43.87	33.22	33.3	7.1	-34.8	0.0	0.0	49.5	38.8	74	54	-24.5	-15.2	H
12.060	3.0	42.43	31.89	37.7	12.4	-32.5	0.0	0.0	60.0	49.4	74	54	-14.0	-4.6	H
Mid Channel															
4.874	3.0	42.42	31.84	33.4	7.2	-34.8	0.0	0.0	48.1	37.5	74	54	-25.9	-16.5	V
12.185	3.0	44.71	35.54	37.6	12.4	-32.5	0.0	0.0	62.2	53.1	74	54	-11.8	-0.9	V
4.874	3.0	43.09	32.37	33.4	7.2	-34.8	0.0	0.0	48.8	38.1	74	54	-25.2	-15.9	H
12.185	3.0	43.23	32.01	37.6	12.4	-32.5	0.0	0.0	60.8	49.5	74	54	-13.2	-4.5	H
High channel															
4.924	3.0	42.53	30.00	33.4	7.2	-34.8	0.0	0.0	48.3	35.8	74	54	-25.7	-18.2	V
12.310	3.0	44.38	35.58	37.6	12.4	-32.5	0.0	0.0	61.9	53.1	74	54	-12.1	-0.9	V
4.924	3.0	43.89	32.05	33.4	7.2	-34.8	0.0	0.0	49.7	37.8	74	54	-24.3	-16.2	H
12.310	3.0	43.22	32.37	37.6	12.4	-32.5	0.0	0.0	60.7	49.9	74	54	-13.3	-4.1	H
No other emission abvo noise floor.															

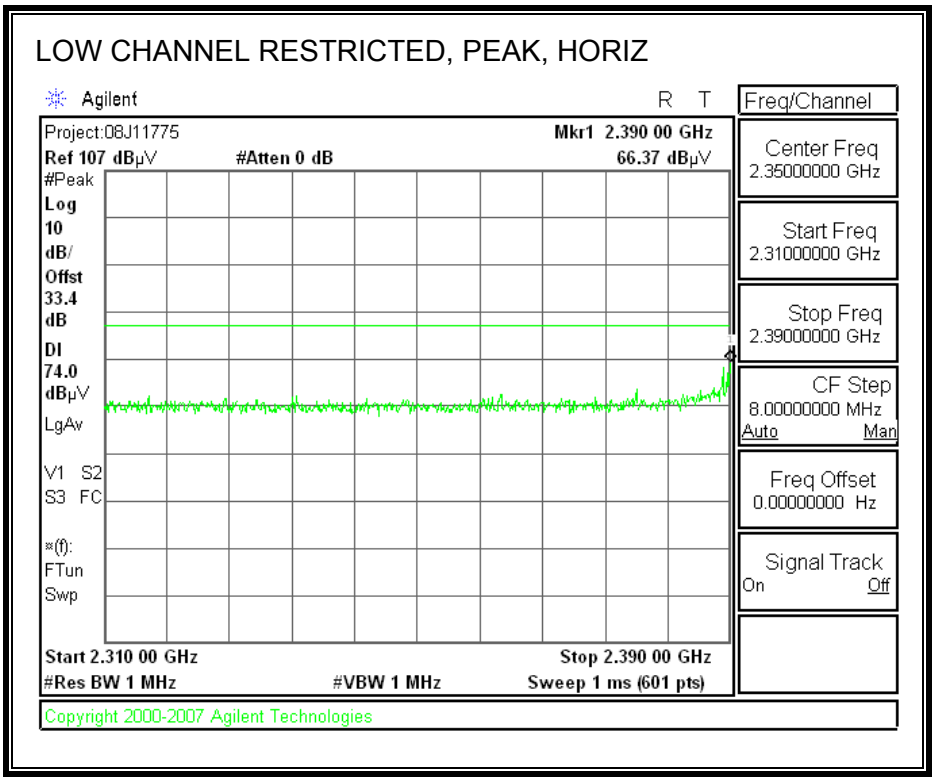
Rev. 4.12.7

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

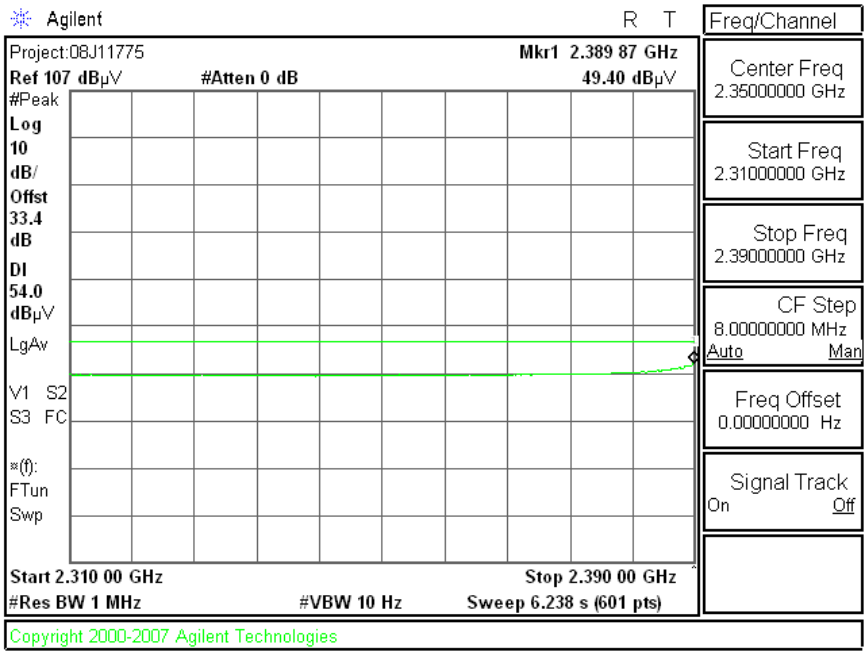
8.2.2. TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

CONFIGURATION 1:

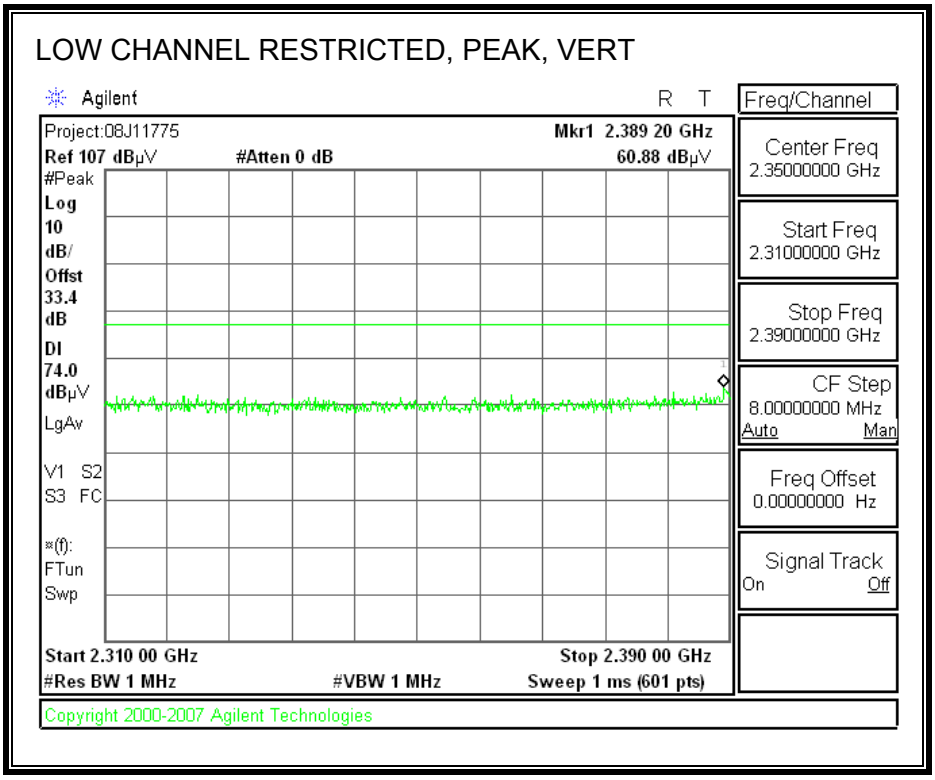
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



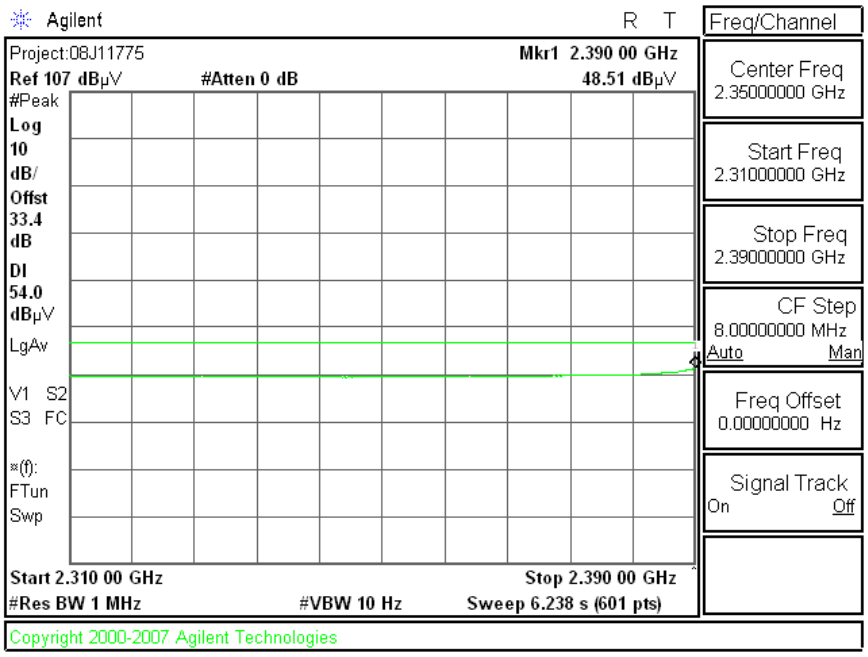
LOW CHANNEL RESTRICTED, AVG, HORIZ



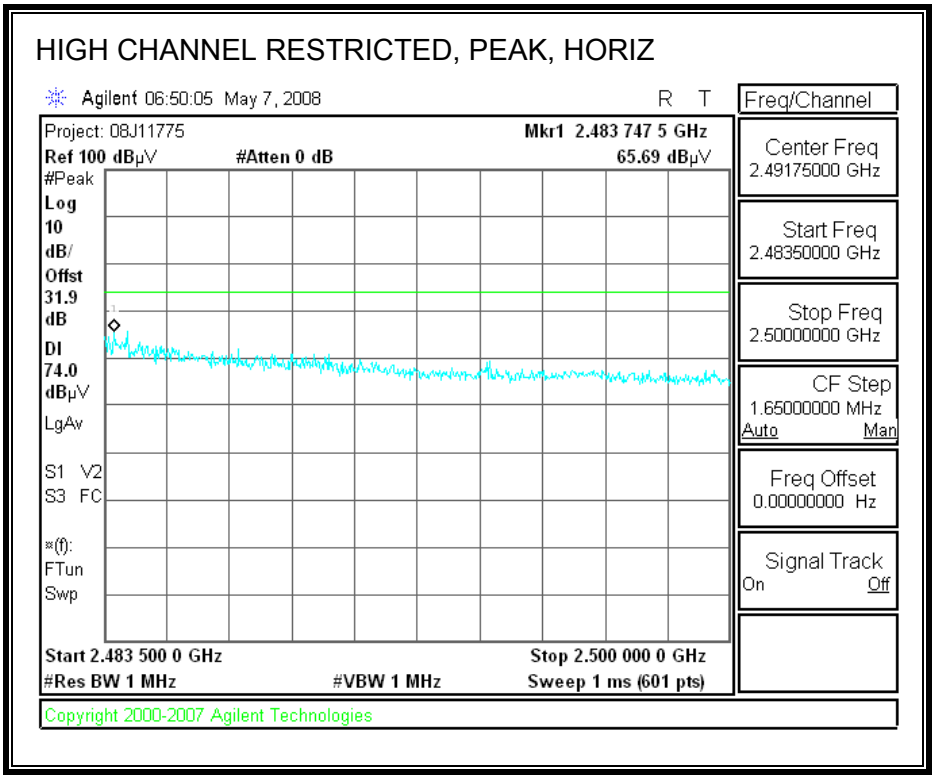
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



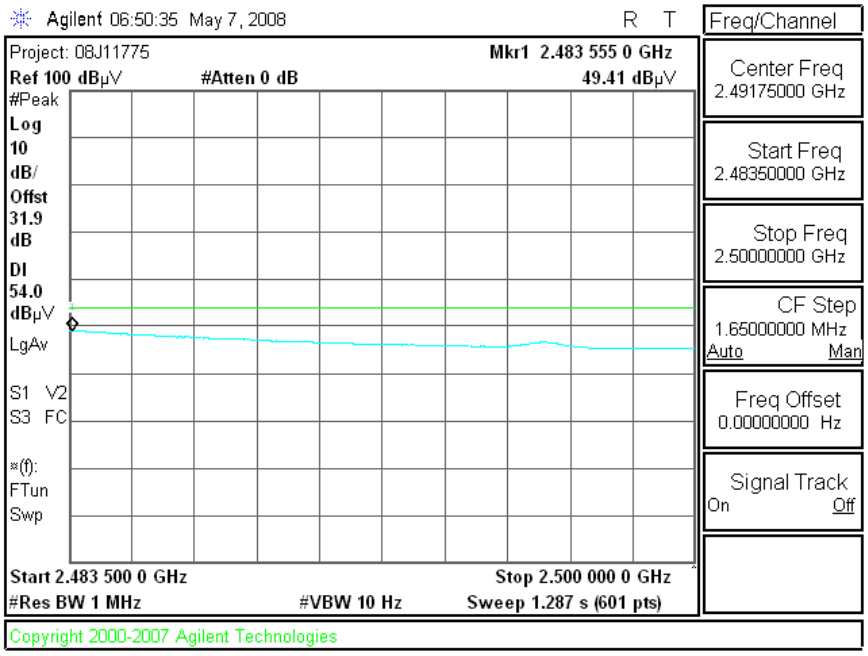
LOW CHANNEL RESTRICTED, AVG, VERT



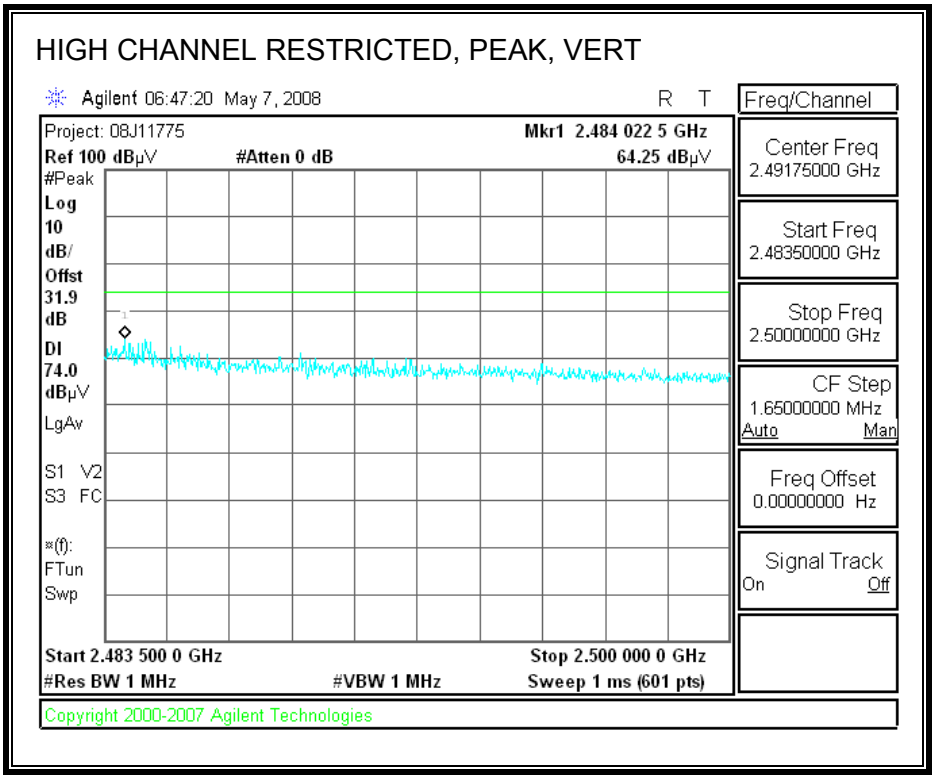
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



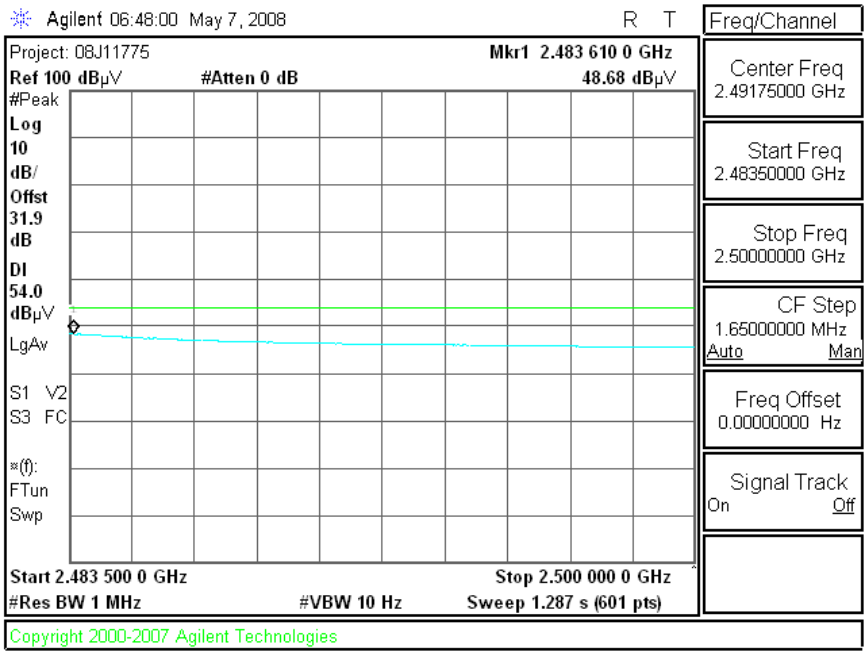
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: May 07, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Transmit g mode, Case 1

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T136; M/N: 3117 @3m	T145 Agilent 3008A005(		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Thanh 187215003	3m Chamber		R_001

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

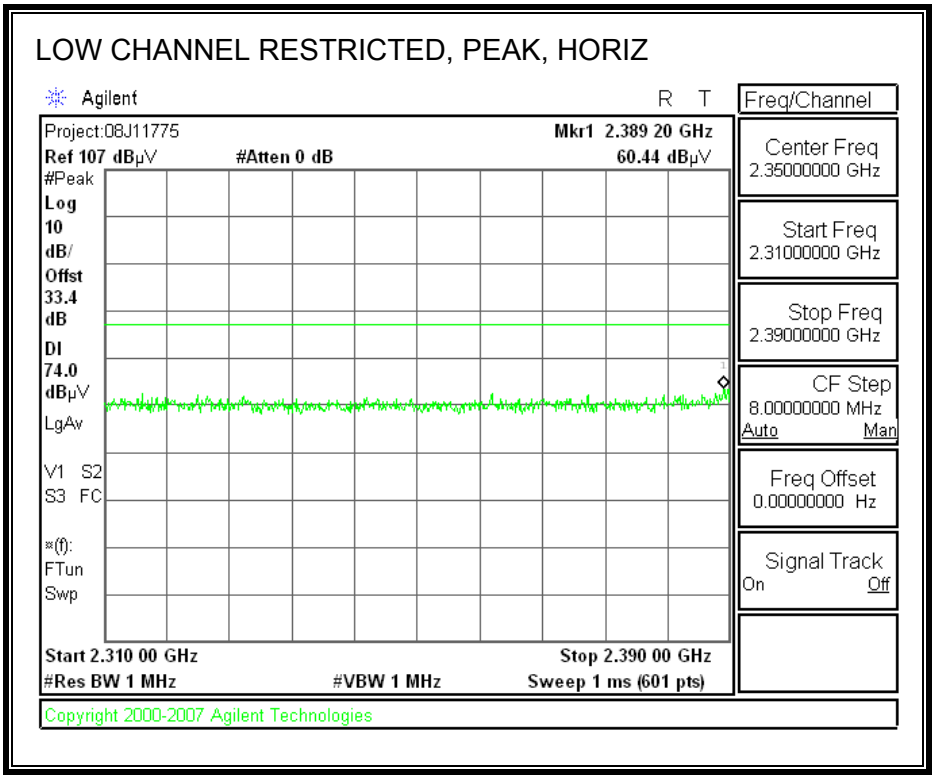
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low channel															
4.824	3.0	44.05	33.47	33.7	0.3	-34.8	0.0	0.0	43.3	32.7	74	54	-30.7	-21.3	V
12.060	3.0	42.56	31.24	37.5	0.7	-32.4	0.0	0.0	48.4	37.1	74	54	-25.6	-16.9	V
4.824	3.0	43.09	31.65	33.7	0.3	-34.8	0.0	0.0	42.3	30.9	74	54	-31.7	-23.1	H
12.060	3.0	44.78	32.76	37.5	0.7	-32.4	0.0	0.0	50.6	38.6	74	54	-23.4	-15.4	H
14.472	3.0	40.82	29.23	38.4	1.1	-32.4	0.0	0.0	47.9	36.3	74	54	-26.1	-17.7	H
Mid Channel															
4.874	3.0	42.82	31.23	33.7	0.4	-34.9	0.0	0.0	42.1	30.5	74	54	-31.9	-23.5	H
7.311	3.0	43.12	32.76	35.2	0.9	-34.7	0.0	0.0	44.6	34.2	74	54	-29.4	-19.8	H
12.185	3.0	42.78	33.06	37.5	0.7	-32.4	0.0	0.0	48.6	38.9	74	54	-25.4	-15.1	H
4.874	3.0	44.14	33.44	33.7	0.4	-34.9	0.0	0.0	43.4	32.7	74	54	-30.6	-21.3	V
7.311	3.0	42.24	32.76	35.2	0.9	-34.7	0.0	0.0	43.7	34.2	74	54	-30.3	-19.8	V
12.185	3.0	41.31	31.54	37.5	0.7	-32.4	0.0	0.0	47.2	37.4	74	54	-26.8	-16.6	V
High channel															
4.924	3.0	42.39	32.94	33.8	0.4	-34.9	0.0	0.0	41.7	32.3	74	54	-32.3	-21.7	V
7.386	3.0	43.18	33.39	35.3	0.9	-34.6	0.0	0.0	44.7	34.9	74	54	-29.3	-19.1	V
12.310	3.0	41.56	31.83	37.5	0.7	-32.4	0.0	0.0	47.4	37.7	74	54	-26.6	-16.3	V
4.924	3.0	42.47	32.85	33.8	0.4	-34.9	0.0	0.0	41.8	32.2	74	54	-32.2	-21.8	H
7.386	3.0	42.80	32.89	35.3	0.9	-34.6	0.0	0.0	44.3	34.4	74	54	-29.7	-19.6	H
12.310	3.0	50.06	38.54	37.5	0.7	-32.4	0.0	0.0	55.9	44.4	74	54	-18.1	-9.6	H
No other emission above noise floor.															

Rev. 4.12.7

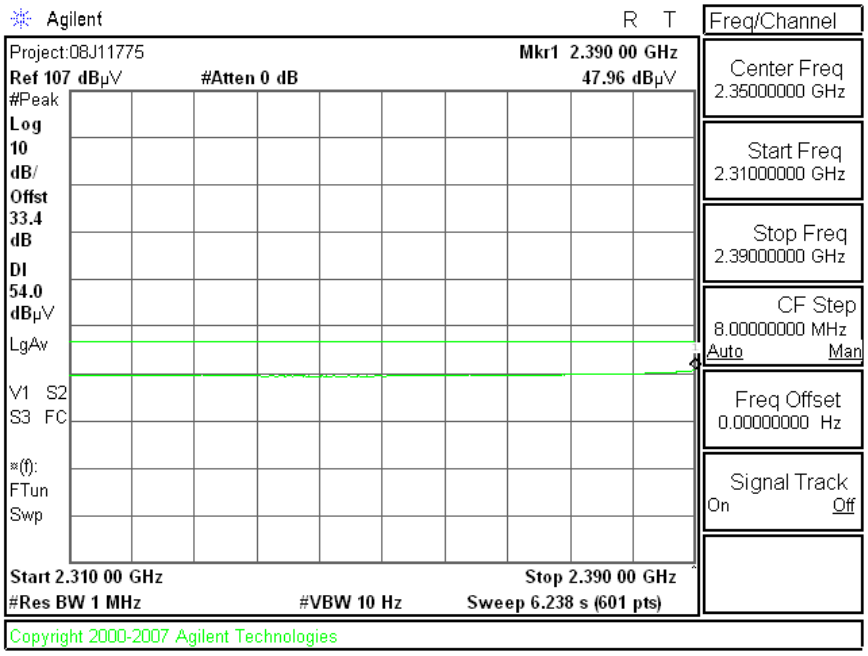
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

CONFIGURATION 2:

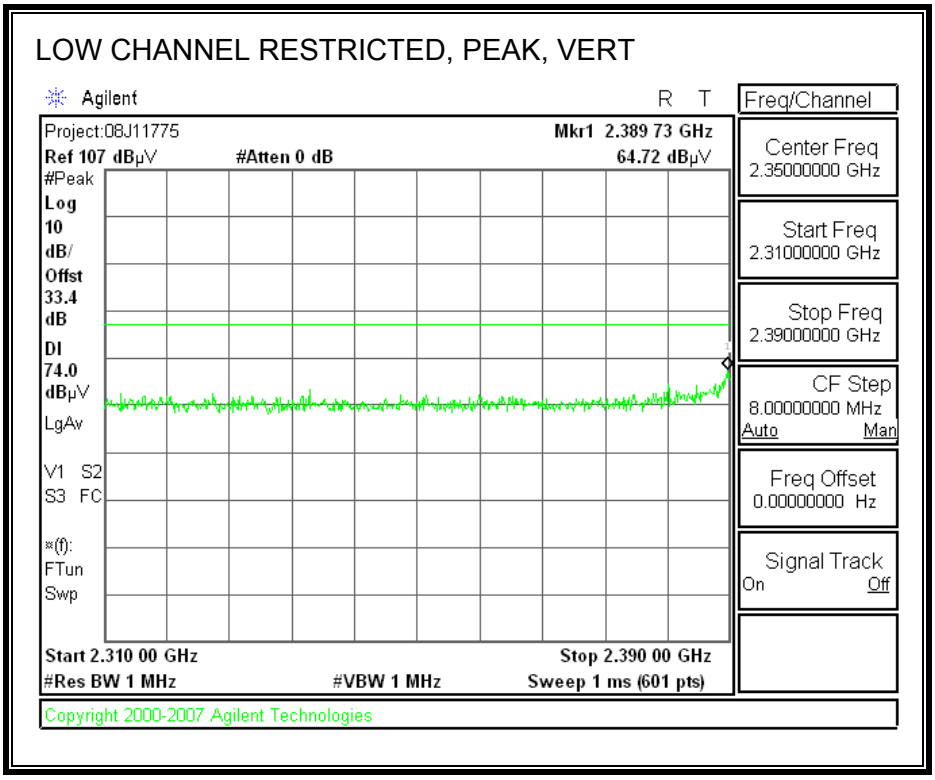
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



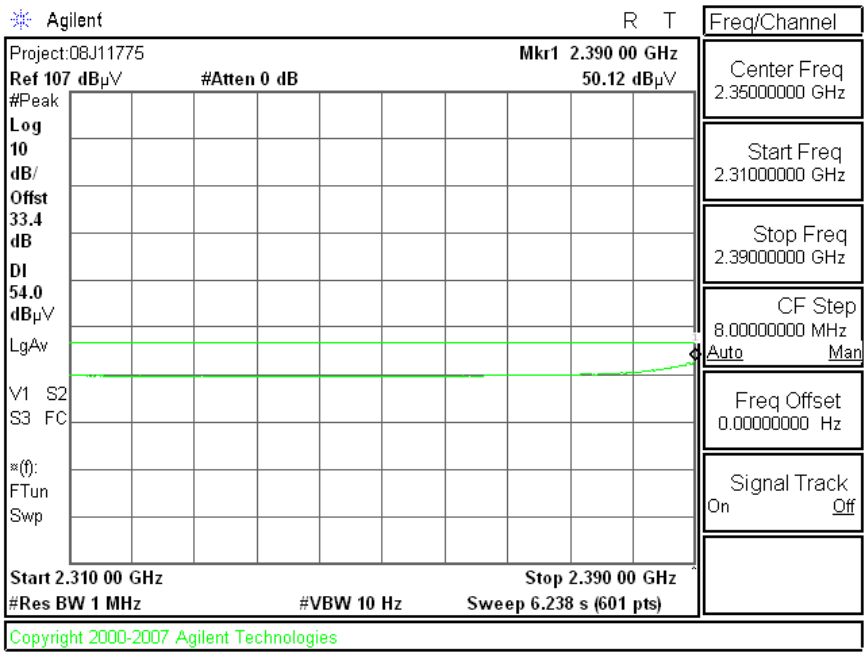
LOW CHANNEL RESTRICTED, AVG, HORIZ



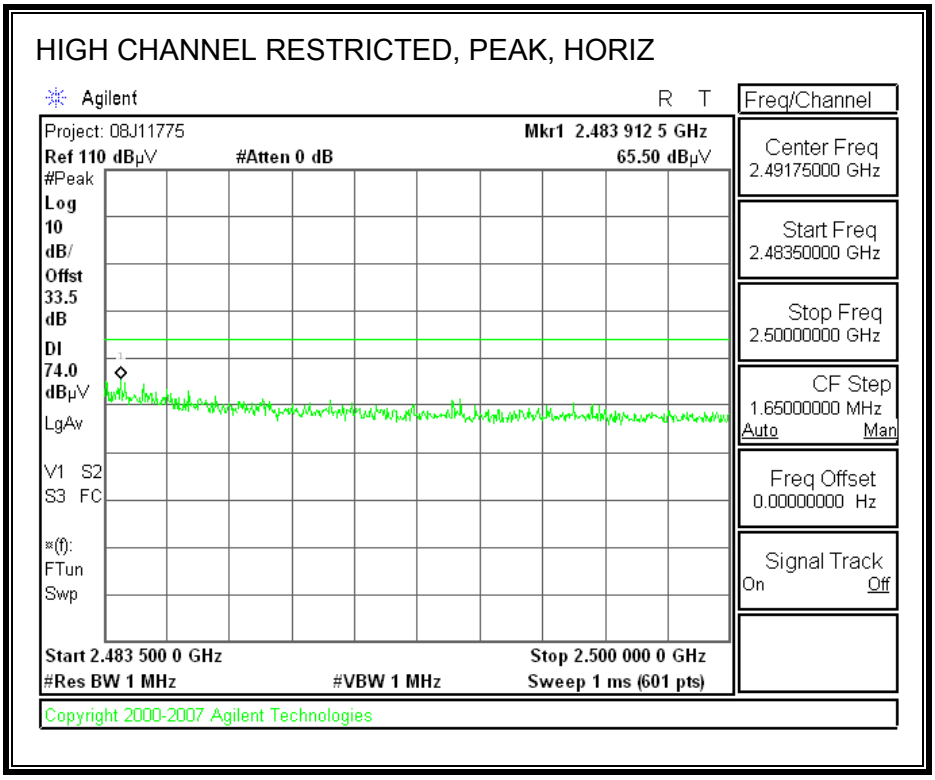
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



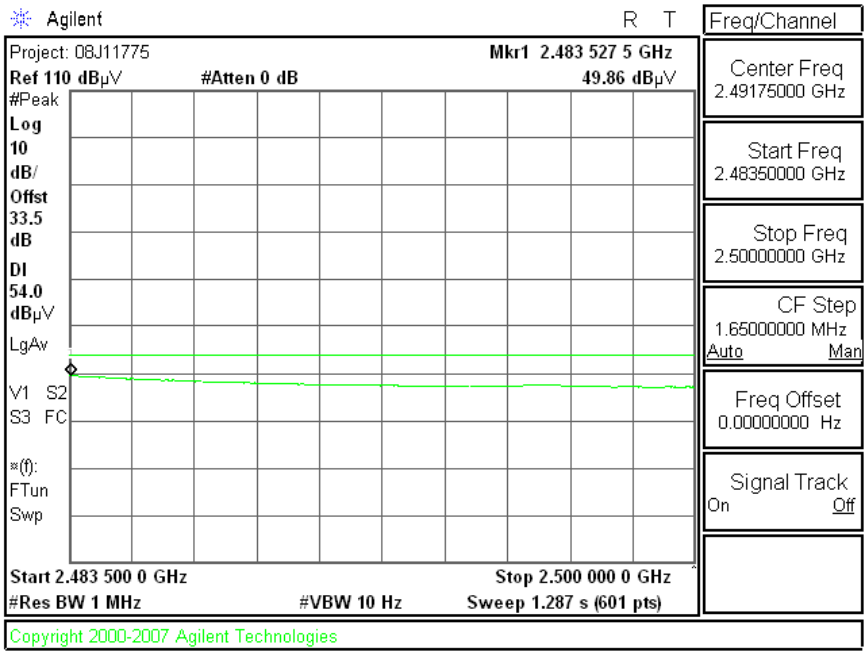
LOW CHANNEL RESTRICTED, AVG, VERT



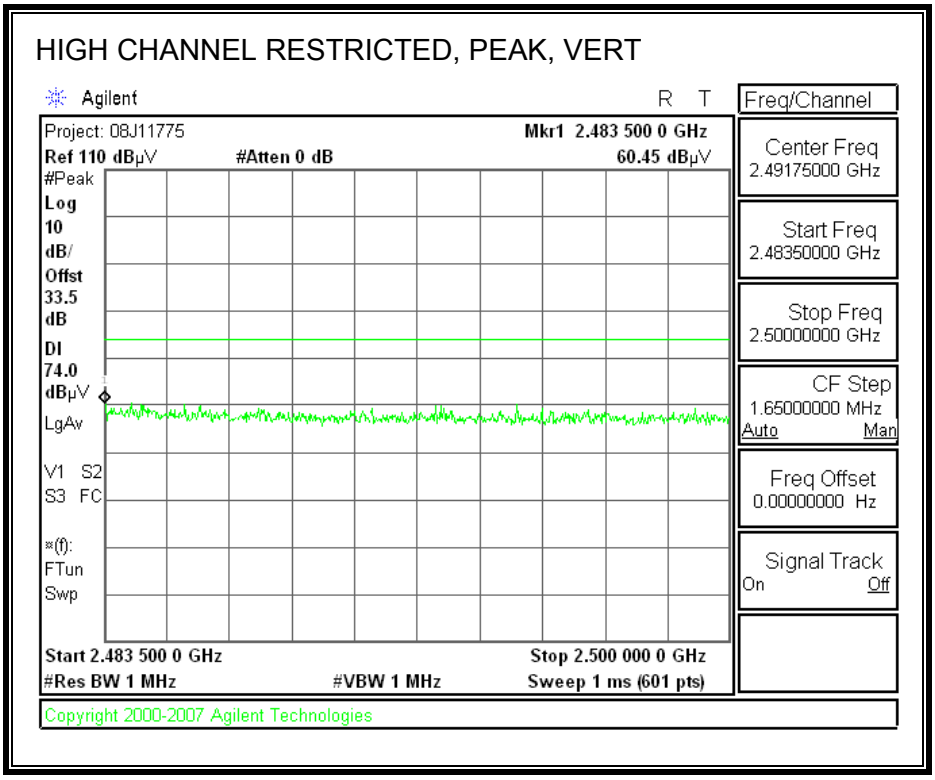
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



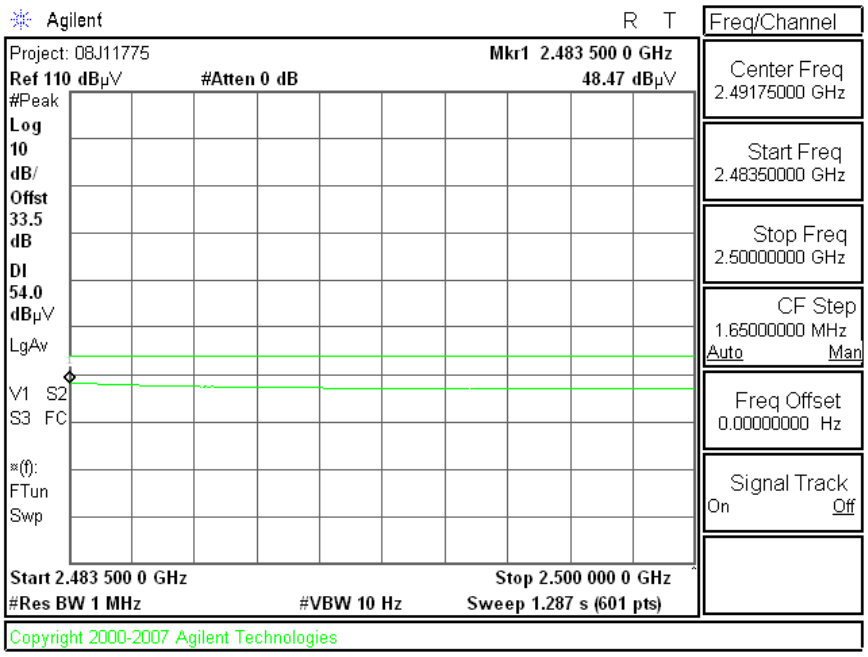
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: May 07, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Transmit g mode, Case 2

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T136; M/N: 3117 @3m	T145 Agilent 3008A005(		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
	Thanh 187215003	3m Chamber		R_001

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

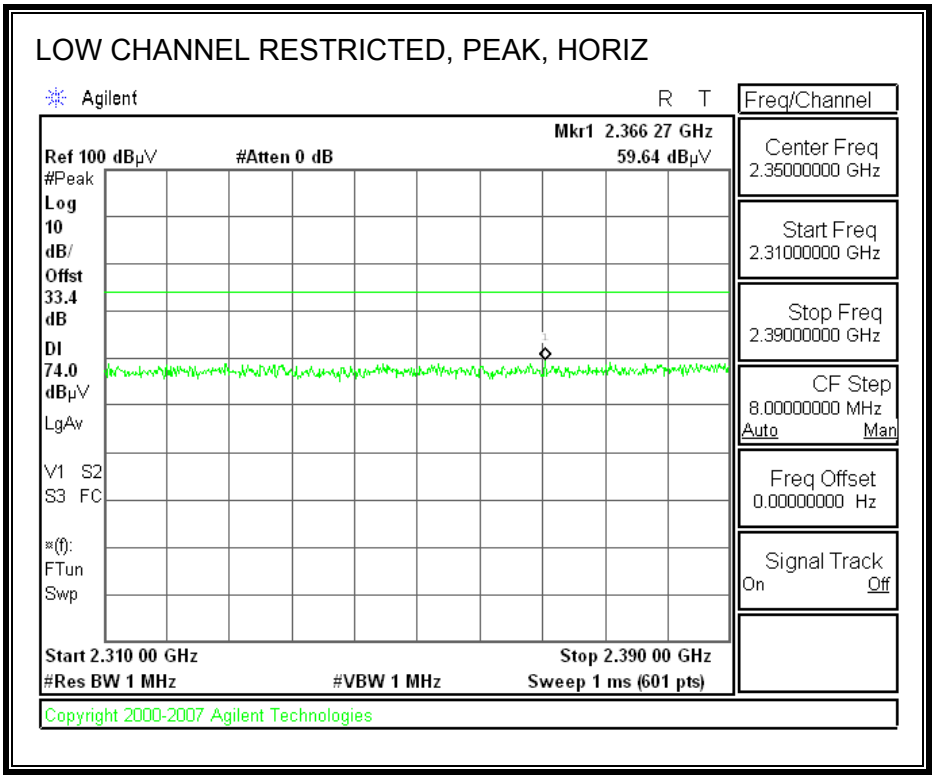
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low channel															
4.824	3.0	42.81	33.36	33.7	0.3	-34.8	0.0	0.0	42.0	32.6	74	54	-32.0	-21.4	V
12.060	3.0	43.41	33.34	37.5	0.7	-32.4	0.0	0.0	49.2	39.2	74	54	-24.8	-14.8	V
4.824	3.0	43.37	34.91	33.7	0.3	-34.8	0.0	0.0	42.6	34.1	74	54	-31.4	-19.9	H
12.060	3.0	46.58	35.78	37.5	0.7	-32.4	0.0	0.0	52.4	41.6	74	54	-21.6	-12.4	H
14.472	3.0	41.27	31.58	38.4	1.1	-32.4	0.0	0.0	48.3	38.6	74	54	-25.7	-15.4	H
Mid Channel															
4.874	3.0	42.96	33.58	33.7	0.4	-34.9	0.0	0.0	42.2	32.8	74	54	-31.8	-21.2	H
7.311	3.0	42.42	32.80	35.2	0.9	-34.7	0.0	0.0	43.9	34.3	74	54	-30.1	-19.7	H
12.185	3.0	42.07	32.14	37.5	0.7	-32.4	0.0	0.0	47.9	38.0	74	54	-26.1	-16.0	H
4.874	3.0	42.77	32.83	33.7	0.4	-34.9	0.0	0.0	42.0	32.1	74	54	-32.0	-21.9	V
7.311	3.0	42.67	33.11	35.2	0.9	-34.7	0.0	0.0	44.2	34.6	74	54	-29.8	-19.4	V
12.185	3.0	41.85	32.17	37.5	0.7	-32.4	0.0	0.0	47.7	38.0	74	54	-26.3	-16.0	V
High channel															
4.924	3.0	42.39	32.94	33.8	0.4	-34.9	0.0	0.0	41.7	32.3	74	54	-32.3	-21.7	V
7.386	3.0	43.18	33.39	35.3	0.9	-34.6	0.0	0.0	44.7	34.9	74	54	-29.3	-19.1	V
12.310	3.0	41.56	31.83	37.5	0.7	-32.4	0.0	0.0	47.4	37.7	74	54	-26.6	-16.3	V
4.924	3.0	43.62	33.21	33.8	0.4	-34.9	0.0	0.0	42.9	32.5	74	54	-31.1	-21.5	H
7.386	3.0	42.61	32.98	35.3	0.9	-34.6	0.0	0.0	44.1	34.5	74	54	-29.9	-19.5	H
12.310	3.0	43.45	33.44	37.5	0.7	-32.4	0.0	0.0	49.3	39.3	74	54	-24.7	-14.7	H
No other emission above noise floor.															

Rev. 4.12.7

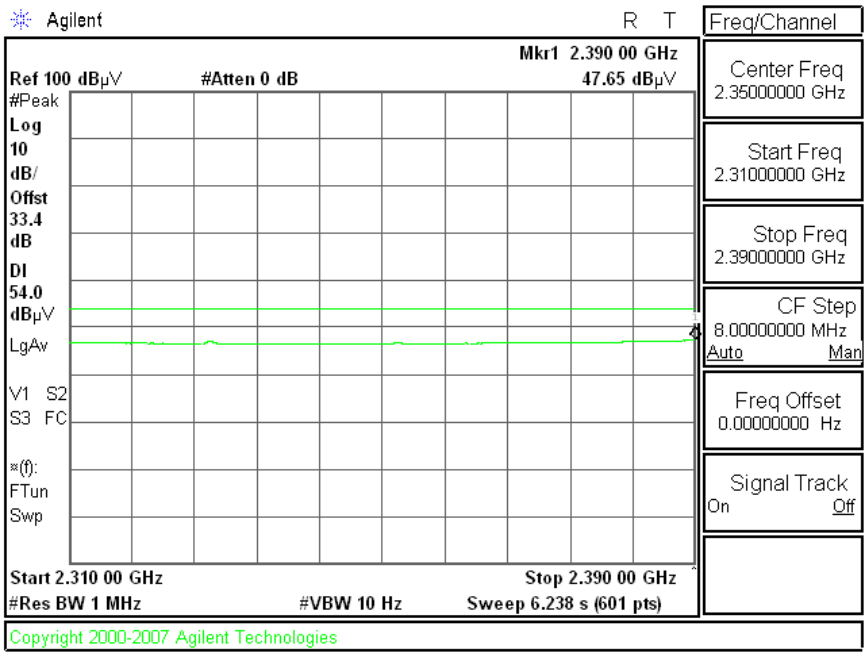
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

CCONFIGURATION 3:

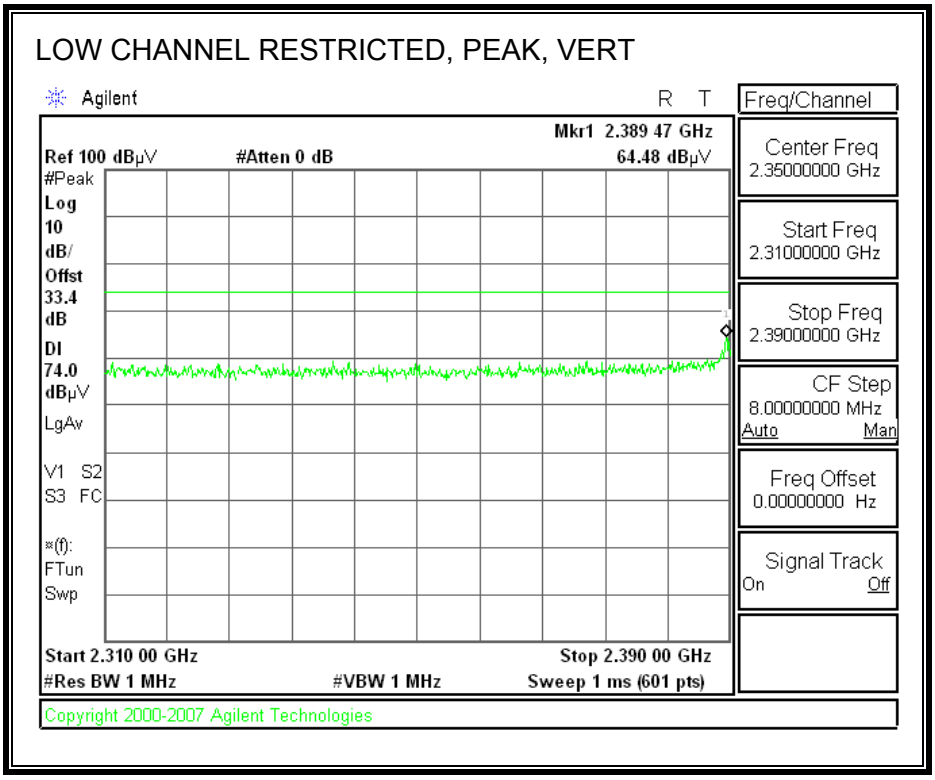
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



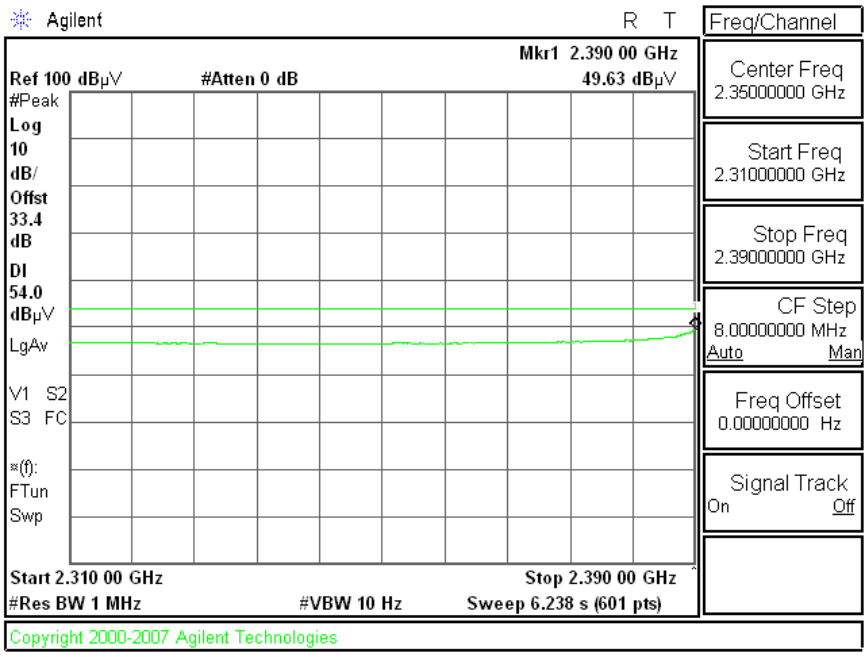
LOW CHANNEL RESTRICTED, AVG, HORIZ



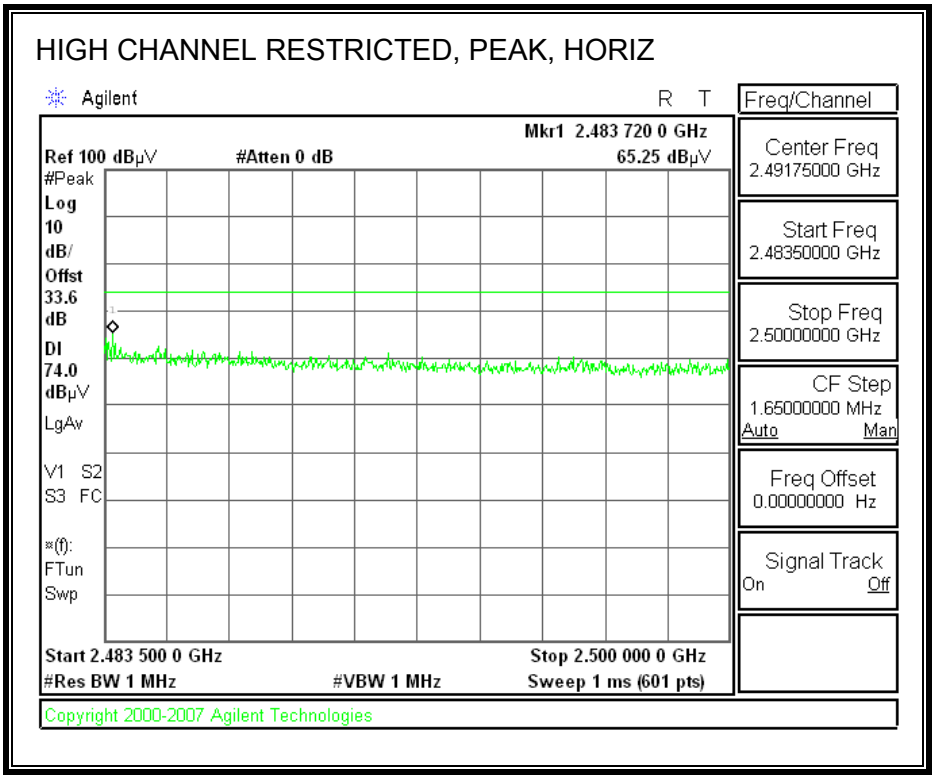
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



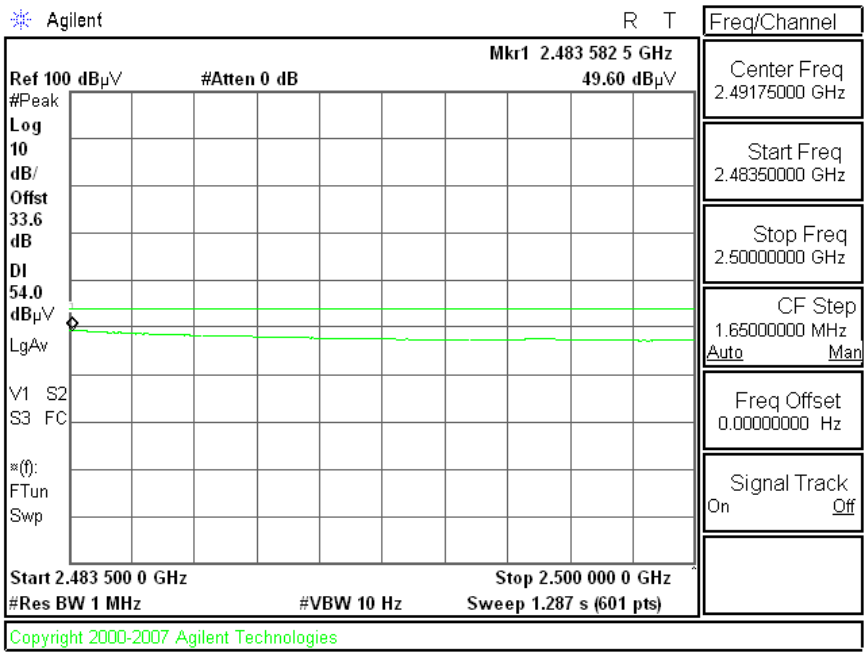
LOW CHANNEL RESTRICTED, AVG, VERT



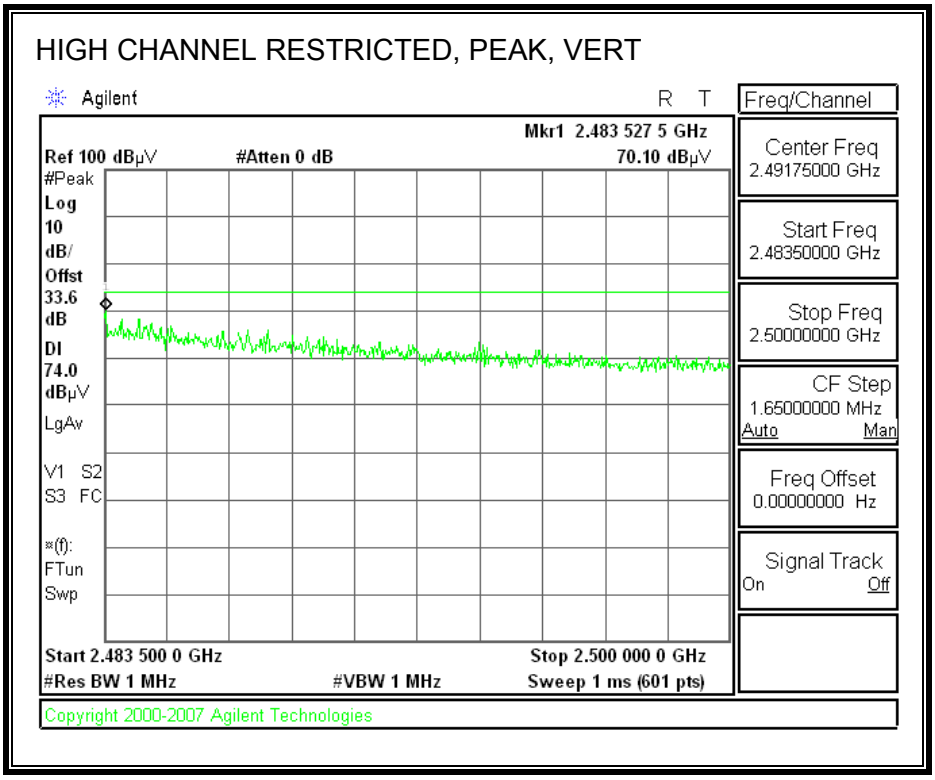
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



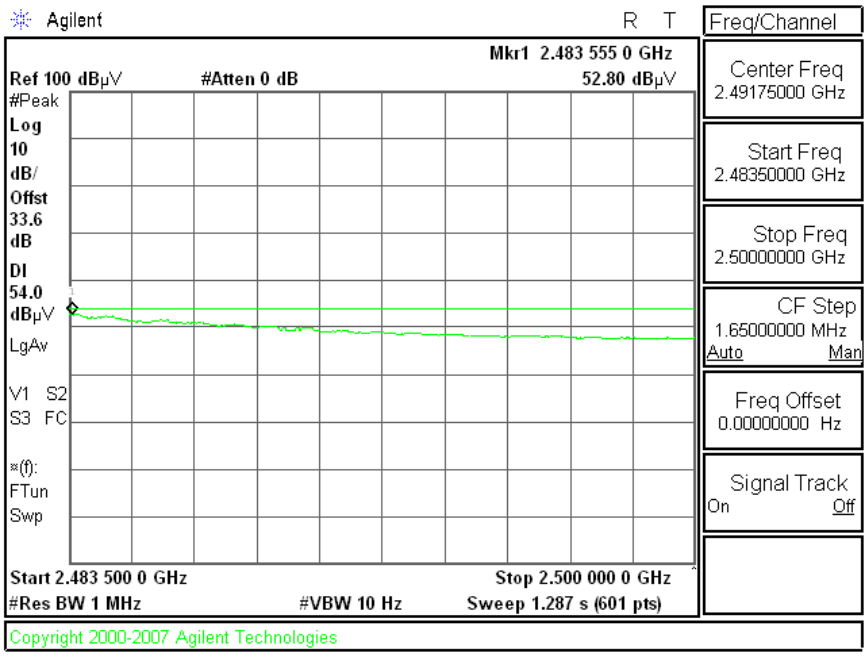
HIGH CHANNEL RESTRICTED, AVG, HORIZ



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 Electric Co., LTD.
Project #: 08J11775-1
Date: 5/7/2008
Test Engineer: Mengistu Mekuria
Configuration: EUT and support equipment.
Mode: Transmit g mode, Case 3

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B		T39; ARA 18-26GHz; S/N:1013	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	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 channel															
12.060	3.0	42.73	30.06	37.7	12.4	-32.5	0.0	0.0	60.3	47.6	74	54	-13.7	-6.4	V
12.060	3.0	42.03	29.50	37.7	12.4	-32.5	0.0	0.0	59.6	47.1	74	54	-14.4	-6.9	H
Mid Channel															
12.185	3.0	44.35	31.64	37.6	12.4	-32.5	0.0	0.0	61.9	49.2	74	54	-12.1	-4.8	V
12.185	3.0	42.61	30.05	37.6	12.4	-32.5	0.0	0.0	60.1	47.6	74	54	-13.9	-6.4	H
High channel															
12.310	3.0	46.59	31.83	37.6	12.4	-32.5	0.0	0.0	64.1	49.3	74	54	-9.9	-4.7	V
12.310	3.0	44.06	30.38	37.6	12.4	-32.5	0.0	0.0	61.6	47.9	74	54	-12.4	-6.1	H
No other emission above noise floor.															

Rev. 4.12.7

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

8.3. RECEIVER ABOVE 1 GHz

8.3.1. RX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi Electric Co., LTD.
Project #: 08J11775-1
Date: May 08, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Receive mode 11b, with Sleeve and Dipole antenna set.

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A-5m Chamber		

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)
1.019	3.0	62.78	52.95	23.9	3.0	-39.5	0.0	0.0	50.2	40.4	74	54	-23.8	-13.6	H
1.499	3.0	63.72	47.91	25.6	3.6	-38.8	0.0	0.0	54.2	38.4	74	54	-19.8	-15.6	H
3.000	3.0	57.97	51.54	30.0	5.3	-37.4	0.0	0.0	55.9	49.5	74	54	-18.1	-4.5	H
1.176	3.0	54.86	50.36	24.4	3.2	-39.2	0.0	0.0	43.3	38.8	74	54	-30.7	-15.2	V
3.000	3.0	53.04	44.19	30.0	5.3	-37.4	0.0	0.0	51.0	42.1	74	54	-23.0	-11.9	V

No other emission above noise floor.

Rev. 4.12.7

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		

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi Electric Co., LTD.
Project #: 08J11775-1
Date: May 12, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Receive mode 11b, with PIFA antenna set.

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-5m Chamber		

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)
1.151	3.0	57.79	44.49	24.3	3.4	-39.3	0.0	0.0	46.3	33.0	74	54	-27.7	-21.0	V
1.500	3.0	57.34	45.38	25.6	3.9	-38.8	0.0	0.0	48.1	36.1	74	54	-25.9	-17.9	V
3.000	3.0	53.78	48.56	30.0	5.6	-37.4	0.0	0.0	52.0	46.7	74	54	-22.1	-7.3	V
1.150	3.0	58.68	49.56	24.3	3.4	-39.3	0.0	0.0	47.2	38.1	74	54	-26.8	-15.9	H
3.000	3.0	58.67	49.33	30.0	5.6	-37.4	0.0	0.0	56.8	47.5	74	54	-17.2	-6.5	H
No other emission above noise floor.															

Rev. 4.12.7

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		

8.3.2. RX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi Electric Co., LTD.
Project #: 08J11775-1
Date: May 08, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Receive mode 11g, with Sleeve and Dipole antenna set.

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A-5m Chamber		

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)
1.019	3.0	61.23	51.34	23.9	3.0	-39.5	0.0	0.0	48.7	38.8	74	54	-25.3	-15.2	H
1.499	3.0	62.45	46.78	25.6	3.6	-38.8	0.0	0.0	52.9	37.3	74	54	-21.1	-16.7	H
3.000	3.0	56.76	50.78	30.0	5.3	-37.4	0.0	0.0	54.7	48.7	74	54	-19.3	-5.3	H
1.176	3.0	55.45	51.23	24.4	3.2	-39.2	0.0	0.0	43.9	39.7	74	54	-30.1	-14.3	V
3.000	3.0	53.23	43.56	30.0	5.3	-37.4	0.0	0.0	51.2	41.5	74	54	-22.8	-12.5	V
No other emission above noise floor.															

Rev. 4.12.7

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		

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Mitsumi Electric Co., LTD.
Project #: 08J11775-1
Date: May 12, 2008
Test Engineer: Thanh Nguyen
Configuration: EUT and support equipment.
Mode: Receive mode 11g, with PIFA antenna set.

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			RX RSS 210

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-5m Chamber		

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)
1.151	3.0	56.78	44.23	24.3	3.4	-39.3	0.0	0.0	45.3	32.7	74	54	-28.7	-21.3	V
1.500	3.0	56.34	44.67	25.6	3.9	-38.8	0.0	0.0	47.1	35.4	74	54	-26.9	-18.6	V
3.000	3.0	53.41	47.99	30.0	5.6	-37.4	0.0	0.0	51.6	46.2	74	54	-22.4	-7.8	V
1.150	3.0	57.21	48.88	24.3	3.4	-39.3	0.0	0.0	45.7	37.4	74	54	-28.3	-16.6	H
3.000	3.0	57.23	48.23	30.0	5.6	-37.4	0.0	0.0	55.4	46.4	74	54	-18.6	-7.6	H
No other emission above noise floor.															

Rev. 4.12.7

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

8.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL DATA

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

Data#: 12 File#: 775emi.emi Date: 05-08-2008 Time: 11:18:40

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: : 08J11775
Company: : Mitsumi Electric Co., LTD
Configuration:: Support Equipment, JIP,EUTon Test PCB
Mode : : Transmit
Target: : FCC Class B
: Case #1 :EUT w/Sleeve and Dipole Ants.
: Transmit worst case.

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	600.360	39.83	-9.84	29.99	46.00	-16.01	Peak
2	743.920	45.83	-7.80	38.03	46.00	-7.97	Peak
3	840.920	43.00	-6.15	36.85	46.00	-9.15	Peak
4	888.450	41.50	-5.23	36.27	46.00	-9.73	Peak

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

VERTICAL DATA

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

Data#: 10 File#: 775emi.emi Date: 05-08-2008 Time: 11:15:48

Condition: FCC CLASS-B VERTICAL
Test Operator:: Thanh Nguyen
Project #: : 08J11775
Company: : Mitsumi Electric Co., LTD
Configuration:: Support Equipment, JIP,EUTon Test PCB
Mode : : Transmit
Target: : FCC Class B
: Case #1 :EUT w/Sleeve and Dipole Ants.
: Transmit worst case.

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	600.360	45.50	-9.84	35.66	46.00	-10.34	Peak
2	743.920	46.67	-7.80	38.86	46.00	-7.14	Peak
3	839.950	42.50	-6.21	36.29	46.00	-9.71	Peak
4	888.450	41.00	-5.23	35.77	46.00	-10.23	Peak
5	936.950	44.83	-4.32	40.51	46.00	-5.49	Peak

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

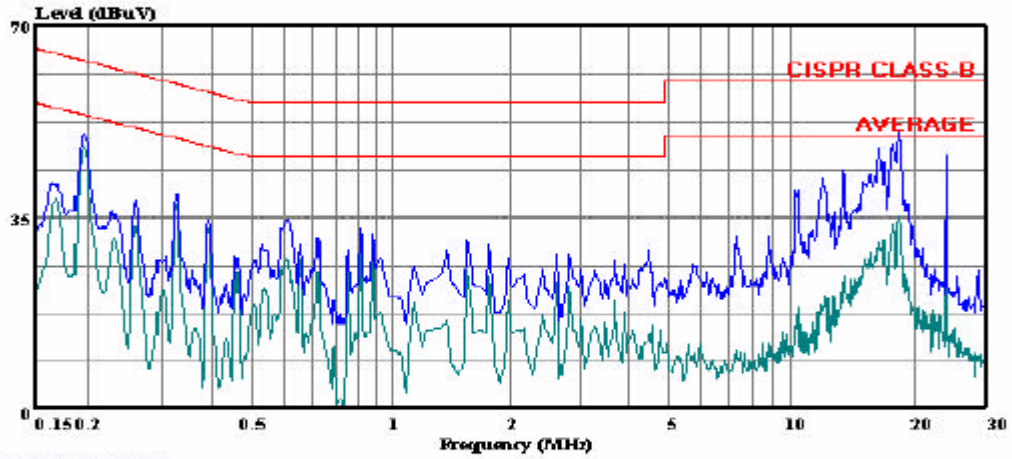
6 WORST EMISSIONS

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
0.20	50.43	--	47.94	0.00	63.82	53.82	-13.39	-5.88	L1
13.55	43.07	--	24.53	0.00	60.00	50.00	-16.93	-25.47	L1
18.33	50.65	--	35.29	0.00	60.00	50.00	-9.35	-14.71	L1
0.20	49.25	--	46.08	0.00	63.82	53.82	-14.57	-7.74	L2
13.62	44.49	--	26.06	0.00	60.00	50.00	-15.51	-23.94	L2
18.33	51.44	--	36.07	0.00	60.00	50.00	-8.56	-13.93	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#: 7 File#: Line Conduction.EMI
Date: 05-06-2008 Time: 16:21:54



(Line Conduction)

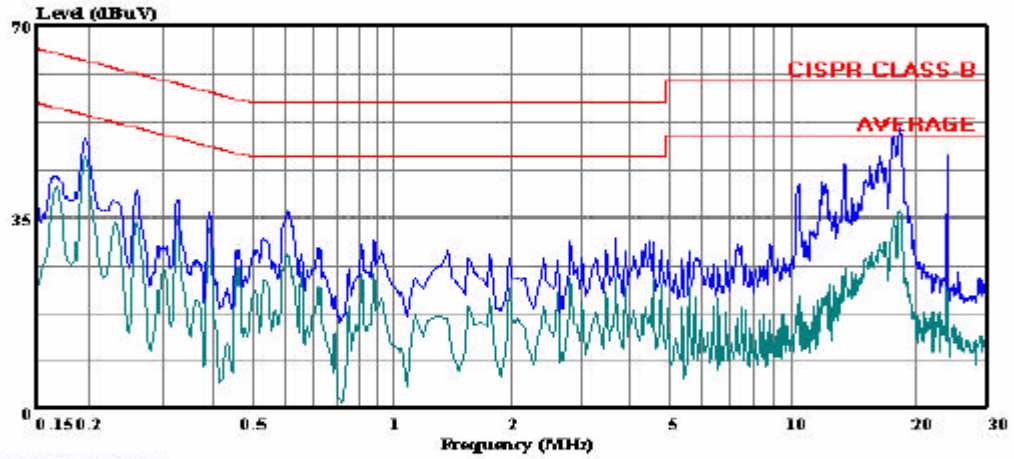
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 08J11775
Company: : MITSUMI ELECTRIC CO., LTD
Configuration:: EUT, PC, Keyboard, Mouse
Mode: : Tx Worst-case
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 1: 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#: 14 File#: Line Conduction.EMI
Date: 05-06-2008 Time: 16:32:52



(Line Conduction)

Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 08J11775
Company: : MITSUMI ELECTRIC CO., LTD
Configuration:: EUT, PC, Keyboard, Mouse
Mode: : Tx Worst-case
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 2: Peak (Blue), Average (Green)

10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	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	*($900/f^2$)	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	*($180/f^2$)	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^2)	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^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

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

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

CALCULATIONS

Given

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

and

$S = E ^ 2 / 3770$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

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

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

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm^2

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

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

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

LIMITS

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

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

RESULTS

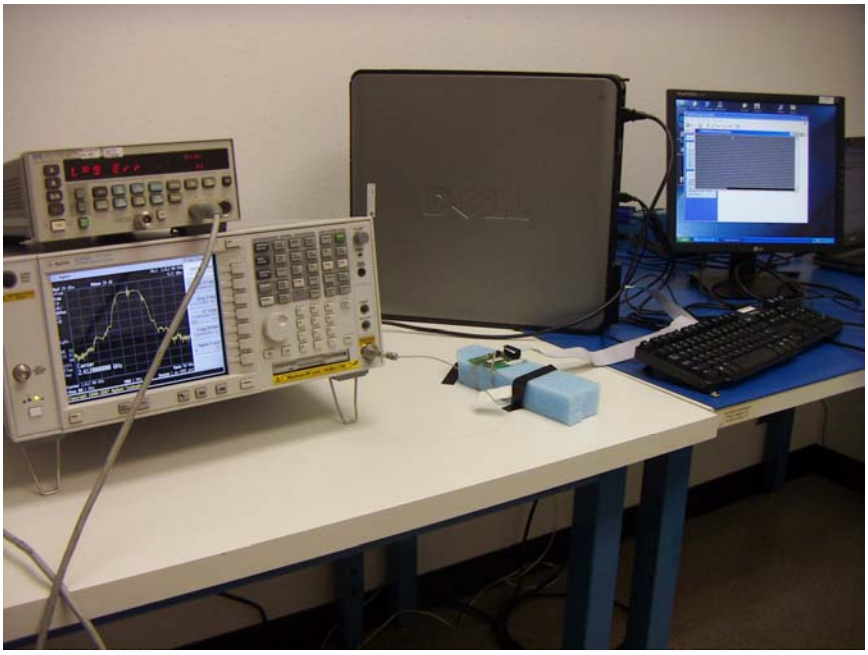
(MPE distance equals 20 cm)

Mode	Band	MPE Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
WLAN	2.4 GHz	20.0	22.58	2.01	0.06	0.57

11. SETUP PHOTOS

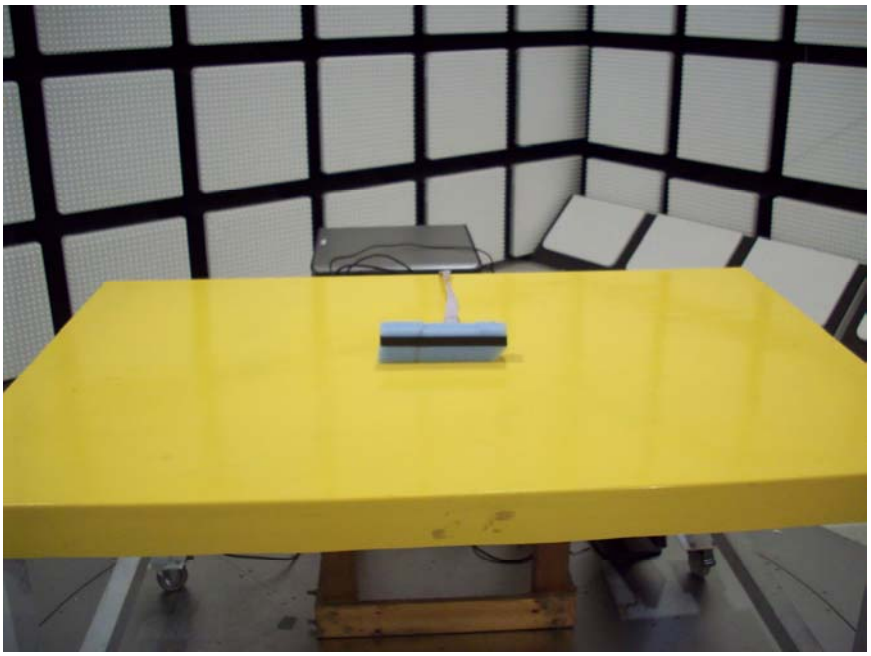
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

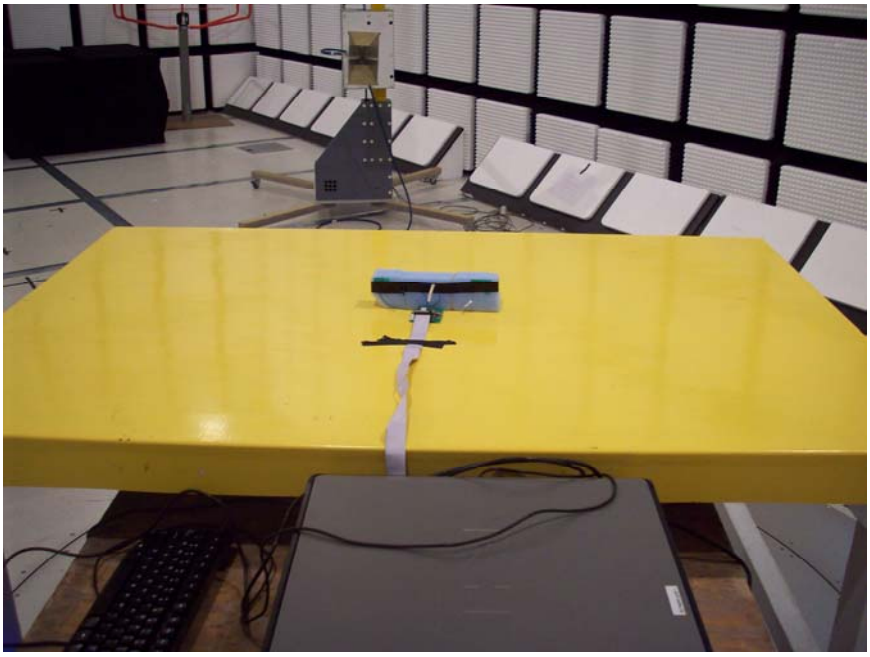


RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO



RADIATED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT