



**FCC CFR47 CLASS II PERMISSIVE CHANGE  
CERTIFICATION**

**802.11b/g HALF SIZE MINI-PCI WLAN MODULE**

**MODEL NUMBER: PA3426U-1MPC**

**FCC ID: CJ6UPA3426WL**

**REPORT NUMBER: 05U3427-1**

**ISSUE DATE: MAY 16, 2005**

*Prepared for*  
**TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY**  
**2-9 SUEHIRO-CHO, OME**  
**TOKYO, 198-8710, JAPAN**

*Prepared by*  
**COMPLIANCE ENGINEERING SERVICES, INC.**  
**d.b.a.**  
**COMPLIANCE CERTIFICATION SERVICES**  
**561F MONTEREY ROAD,**  
**MORGAN HILL, CA 95037, USA**  
**TEL: (408) 463-0885**  
**FAX: (408) 463-0888**

**NVLAP<sup>®</sup>**  
**LAB CODE:200065-0**

Revision History

<u>Rev.</u>	<u>Revisions</u>	<u>Revised By</u>
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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY  
2-9 SUEHIRO-CHO, OME  
TOKYO, 198-8710, JAPAN

**EUT DESCRIPTION:** 802.11 b/g HALF SIZE MINI-PCI WLAN MODULE

**MODEL:** PA3426U-1MPC

**SERIAL NUMBER:** 04B-0619

**DATE TESTED:** MAY 11-16, 2005

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

Approved & Released For CCS By:

Tested By:



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THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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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 and FCC CFR 47 Part 15.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 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 WLAN.

The radio module is manufactured by Atheros.

### 5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

The EUT was originally tested and reported under CCS project no.: 04U3194, and granted by TCB on February 28, 2005. Then CCS project no: 05U3307, and granted by TCB on March 24, 2005. The major change filed under this application is:

1. Components changed:

- \_ Changed C146 from 105  $\Omega$  change to 39  $\Omega$
- \_ Changed R128 from 130  $\Omega$  change to 261  $\Omega$
- \_ Changed R130 from 150  $\Omega$  change to 121  $\Omega$

Based on previous report filing number 05U3307-1, Libretto laptop configuration is the worst case at all, so additional tests were conducted on g-mode low and band edges, and b-mode harmonic spurious for radiated emissions at mid channel.

2. The EUT is being used in a different host.

- \_ Las Vegas Laptop: additional tests were conducted on radiated emissions and AC power line conducted emissions, while conducted emissions data remains the same as what was performed under CCS project no.: 04U3194.

### 5.3. MAXIMUM OUTPUT POWER

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

2400 to 2483.5 MHz Authorized Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	19.44	87.90
2412 - 2462	802.11g	22.97	198.15
2412 - 2462	802.11g Turbo	21.53	142.23

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes four PIFA Film type antennas, each has a maximum gain as follows:

PIFA type antennas:

1. HTL017 - 4.24 dBi at 2.4GHz without cable loss;
2. HTL004 - 4.18 dBi at 2.4GHz without cable loss;
3. HTL008 - 2.89 dBi at 2.4GHz without cable loss;
4. TIAN01 - 4.02 dBi at 2.4GHz without cable loss.

The HTL017 antenna, which has the highest gain, represents the worst-case scenario.

### 5.5. SOFTWARE AND FIRMWARE

The test firmware was installed in the EUT during testing.

The test utility software used during testing was “art program” rev.4.8

### 5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2412 MHz for both b and g modes.

The worst-case data rate for this channel is determined to be 1 Mb/s for b mode and 6 Mb/s for g mode, based on previous experience with 802.11b/g WLAN product design architectures

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba Libretto	XAL580TNHW	22062758J	DoC
AC Adapter	Toshiba	PA24404	0110C1123893	NA
AC Adapter	Toshiba	PA3241U-1ACA	0409A5177935G	DoC
Laptop	Toshiba Las Vegas	PLU10N-AAA14	04B-0619	DoC

### I/O CABLES

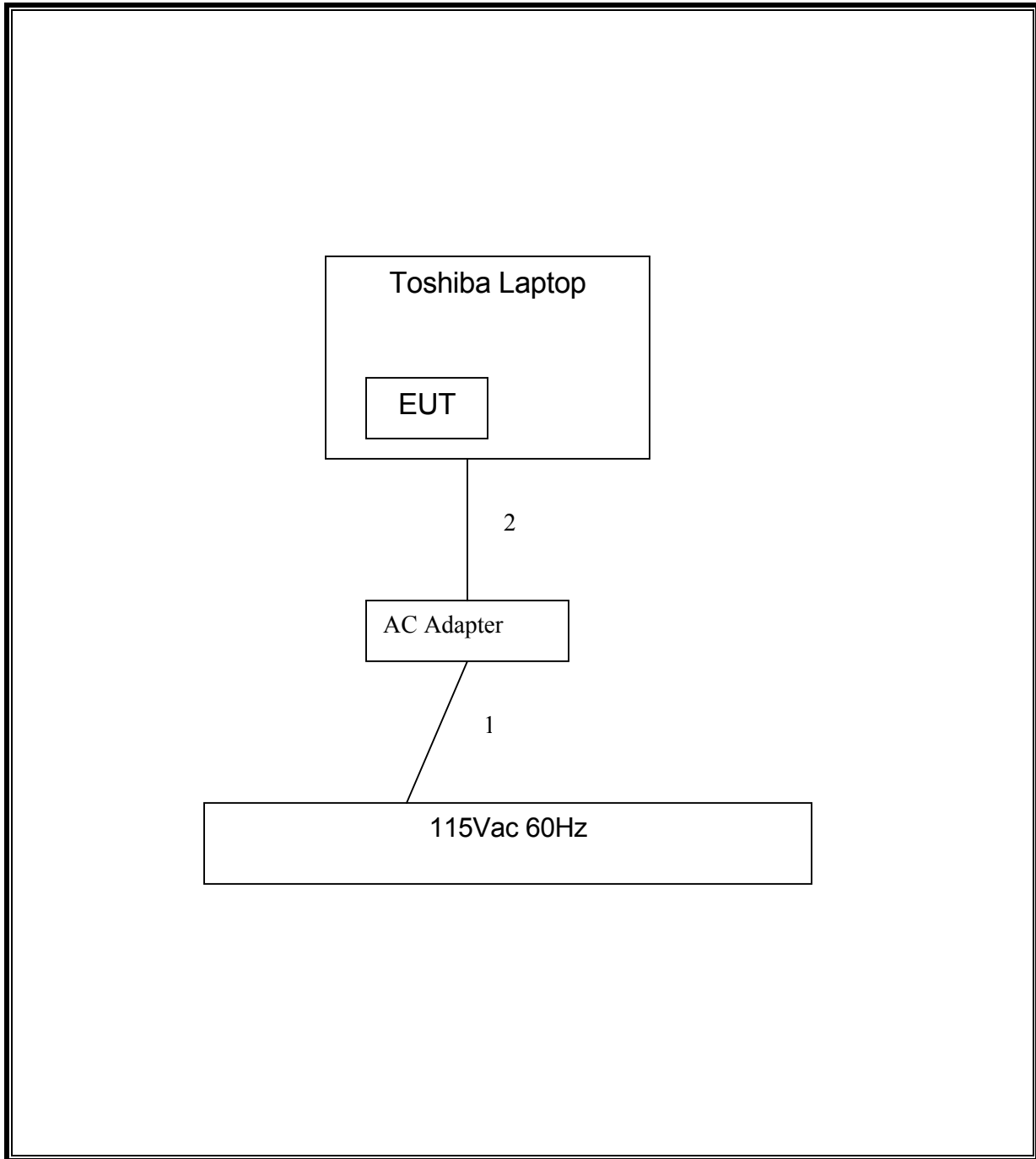
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	115VAC	Unshielded	2m	No
2	DC	1	DC	Unshielded	1.5m	No

### TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.



**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/2005
30MHz - 2Ghz	Sunol Sciences	JB1 Antenna	A121003	9/12/2005
RF Filter Section	HP	85420E	3705A00256	3/6/2006
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	3/6/2006
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/2005
Antenna, Horn 18 ~ 26 GHz	ARA	SWH-28	1007	9/12/2005
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2005
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
Spectrum Analyzer	HP	E4446A	US42510266	8/25/2005
Peak Power Meter	Agilent	E4416A	GB41291160	1/9/2006
Peak / Average Power Sensor	Agilent	E9327A	US40440755	1/10/2006
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	8/17/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	9/12/2005
4.0GHz HPF	Microtronic	HPM13351	2	CNR
Preamplifier, 1 ~ 26.5 GHz	HP	8449B	3008A00369	8/17/05

## 7. LIMITS AND RESULTS

### 7.1. AVERAGE POWER

#### AVERAGE POWER LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

No non-compliance noted:

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

#### 802.11b Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	16.56
Middle	2437	16.39
High	2462	16.45

#### 802.11g Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	15.21
Middle	2437	15.05
High	2462	15.12

#### 802.11g Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Middle	2437	15.00

## 7.2. RADIATED EMISSIONS

### 7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

#### LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## **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.

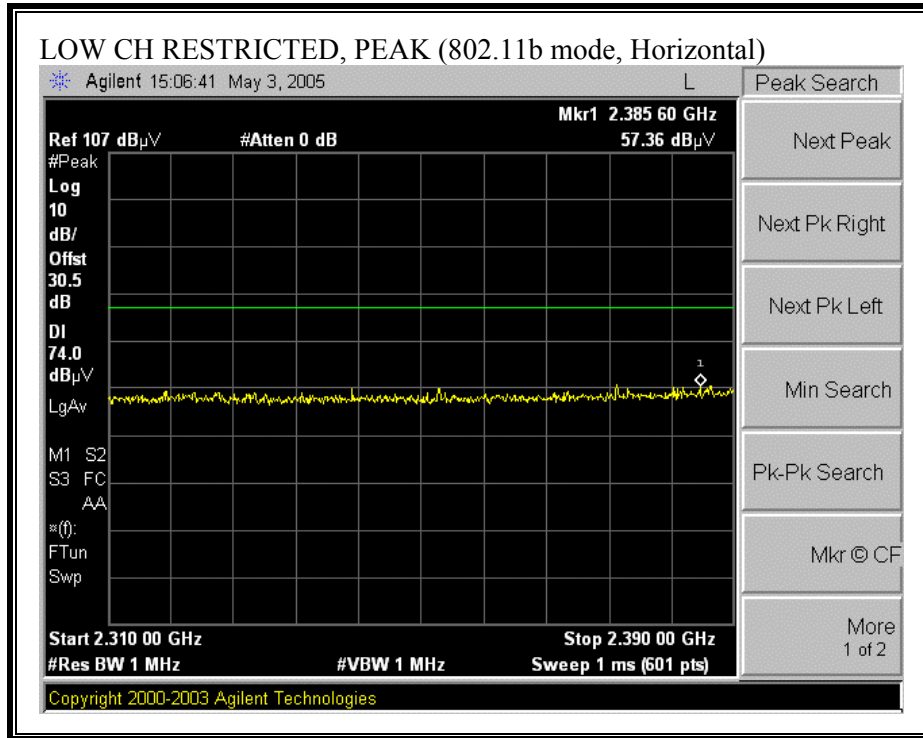
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

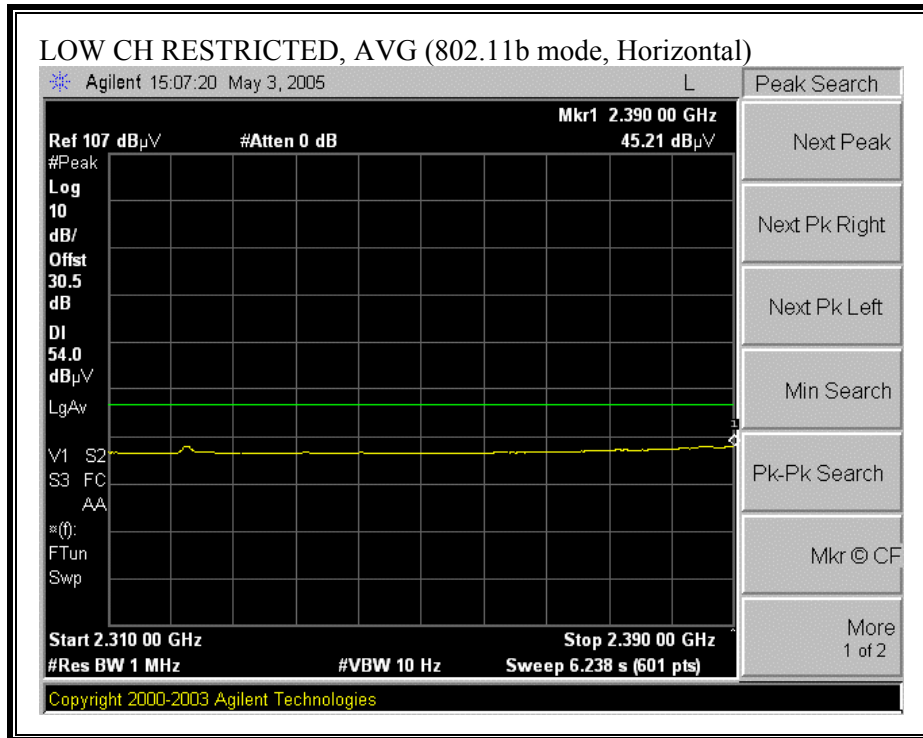
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

### 7.2.2. TRANSMITTER ABOVE 1 GHz (WITH LIBRETTO LAPTOP)

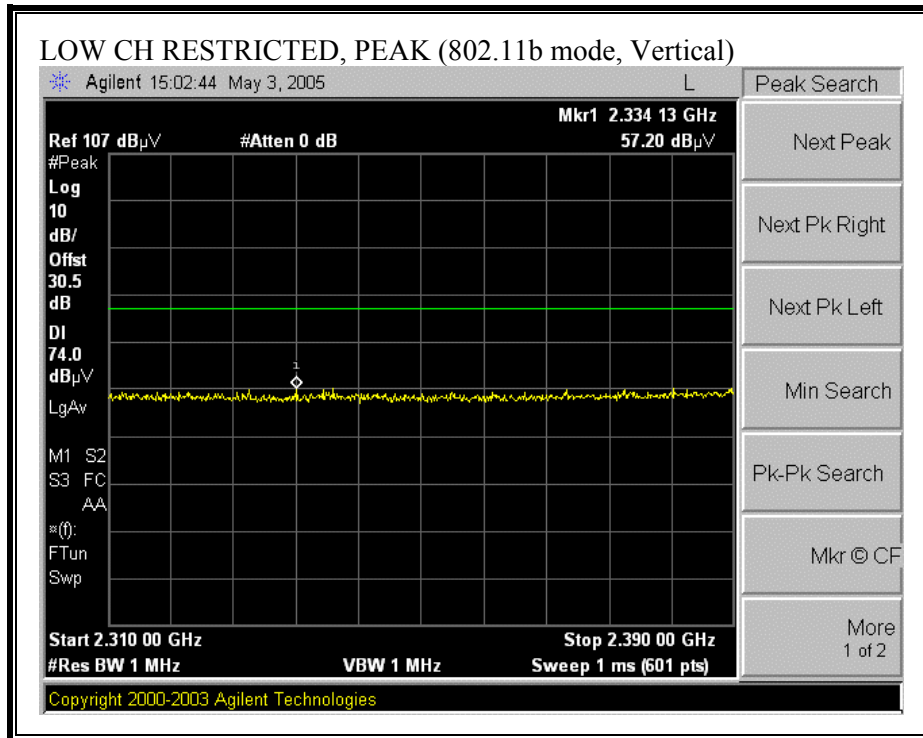
#### RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

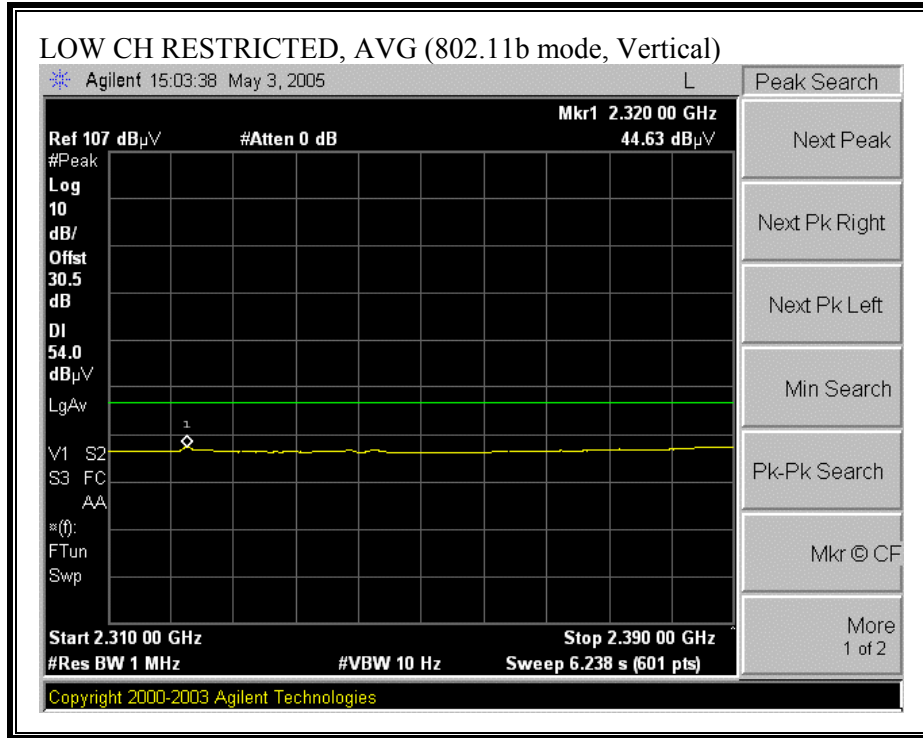




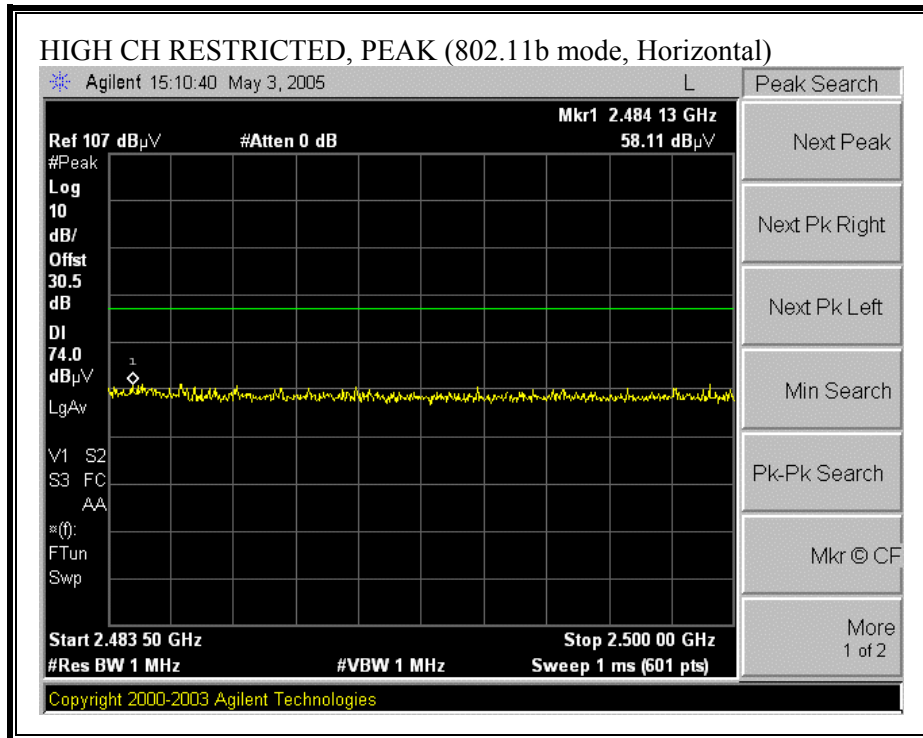


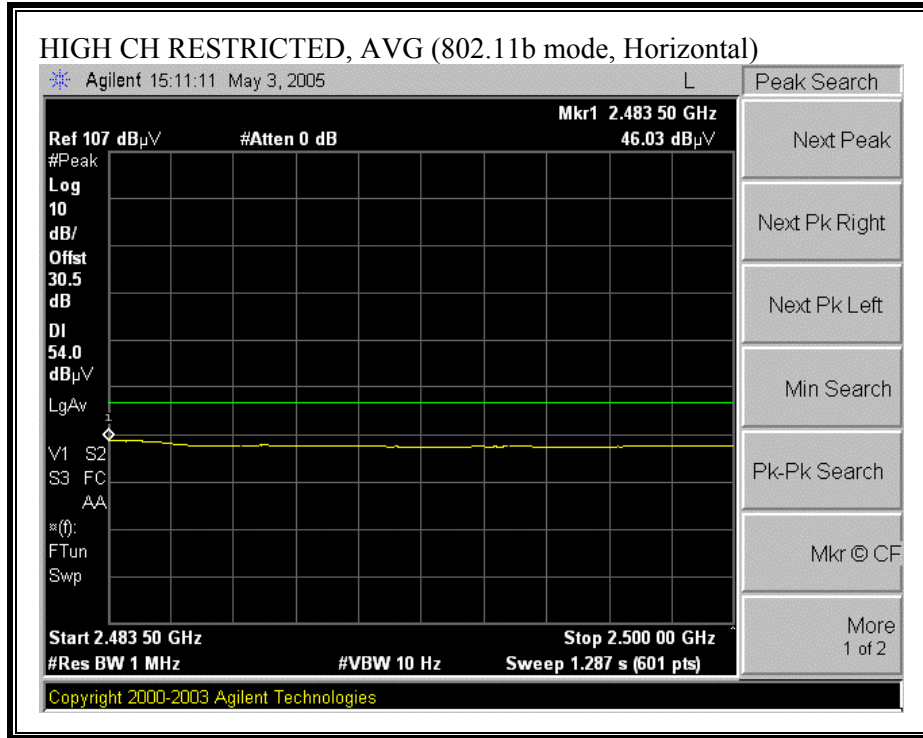
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)**



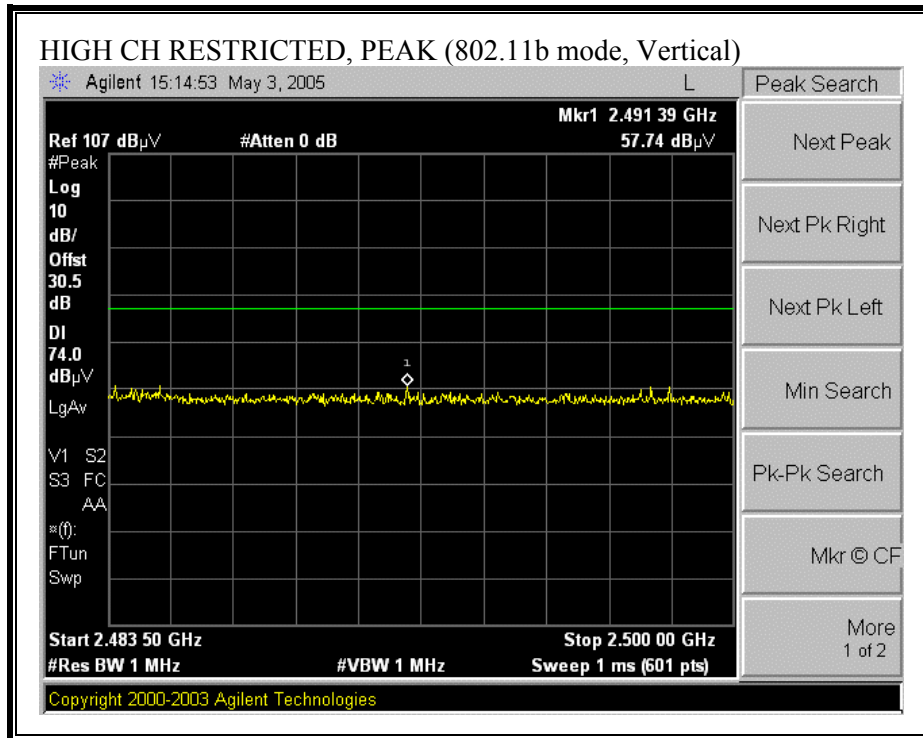


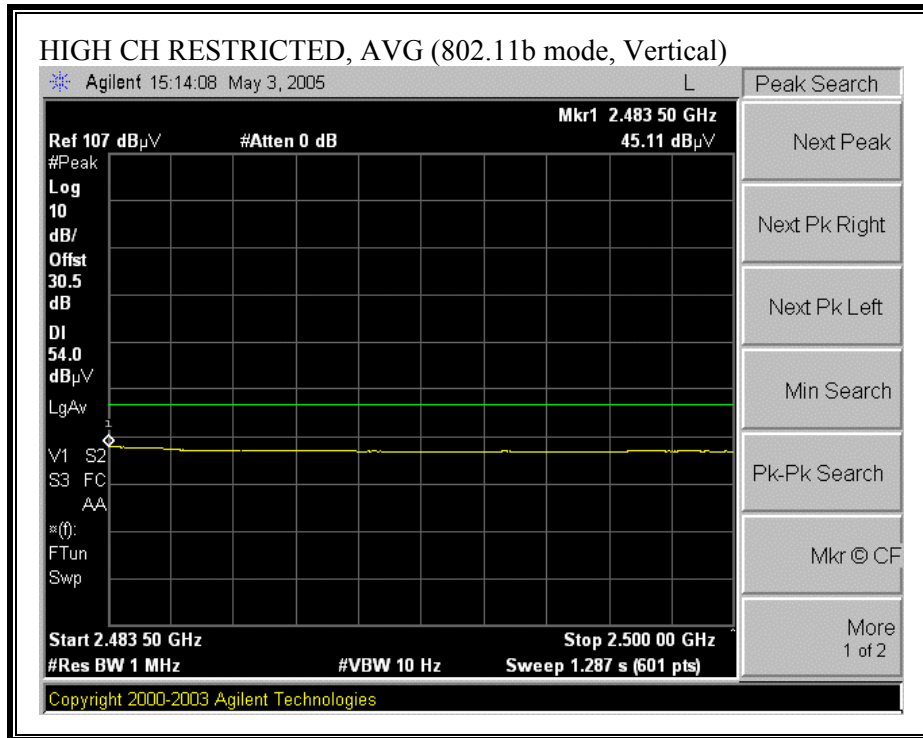
**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**





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





**HARMONICS AND SPURIOUS EMISSIONS (b MODE)**

05/02/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang  
 Project #: 053427-1  
 Company: Toshiba  
 EUT Descrip.: MB51H 802.11b/g Half Size Mini-PCI WLAN Module-g Turbo (Libretto & HTL017 Ant)  
 EUT M/N: PA3426U-1MPC (Component Changed)  
 Test Target: FCC 15.247  
 Mode Oper: TX, b mode  
 Average Power Meter: Low = 16.56 dBm, Mid = 16.39 dBm, High = 16.45 dBm

Test Equipment:

EMCO Horn 1-18GHz TS9; S/N: 3245 @3m	Pre-amplifier 1-26GHz T86 Miteq 924341	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable 4_Thank	12 foot cable 12 Neelesh	HPF HPF_4.0GHz	Reject Filter
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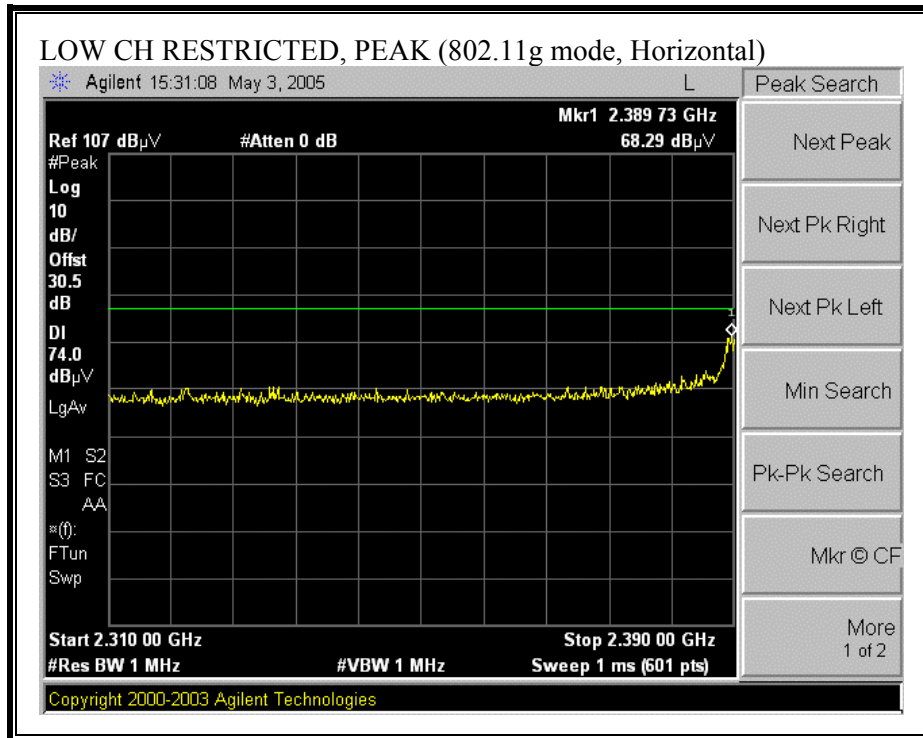
Peak Measurements  
 RBW=VBW=1MHz  
 Average Measurements  
 RBW=1MHz; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
mid Ch															
4.874	3.0	51.6	39.4	33.3	4.1	-44.1	0.0	0.6	45.5	33.3	74	54	-28.5	-20.7	V
7.311	3.0	54.0	45.3	35.8	5.4	-44.7	0.0	0.6	51.1	42.4	74	54	-22.9	-11.6	V
4.874	3.0	51.5	38.5	33.3	4.1	-44.1	0.0	0.6	45.4	32.4	74	54	-28.6	-21.6	H
7.311	3.0	53.4	41.5	35.8	5.4	-44.7	0.0	0.6	50.5	38.6	74	54	-23.5	-15.4	H

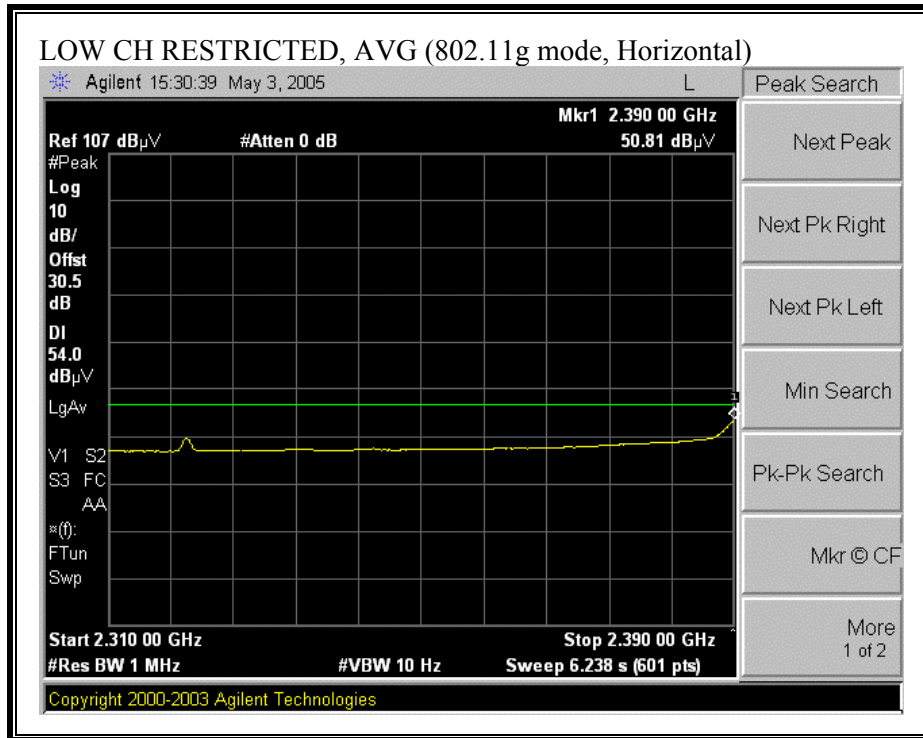
Note: No other emissions were detected above the system noise floor.

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		

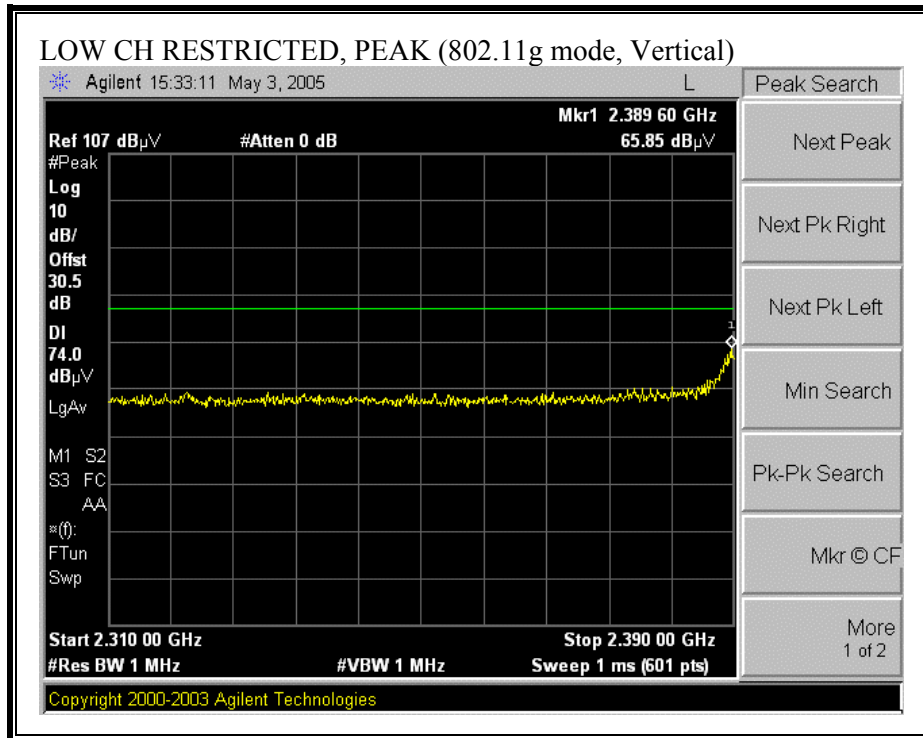
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**

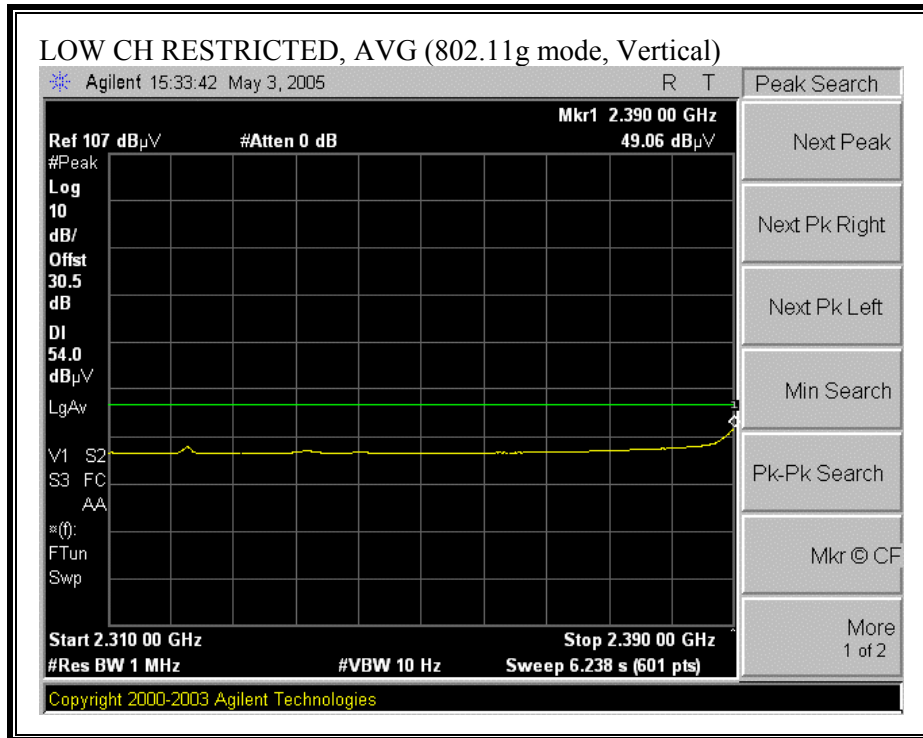




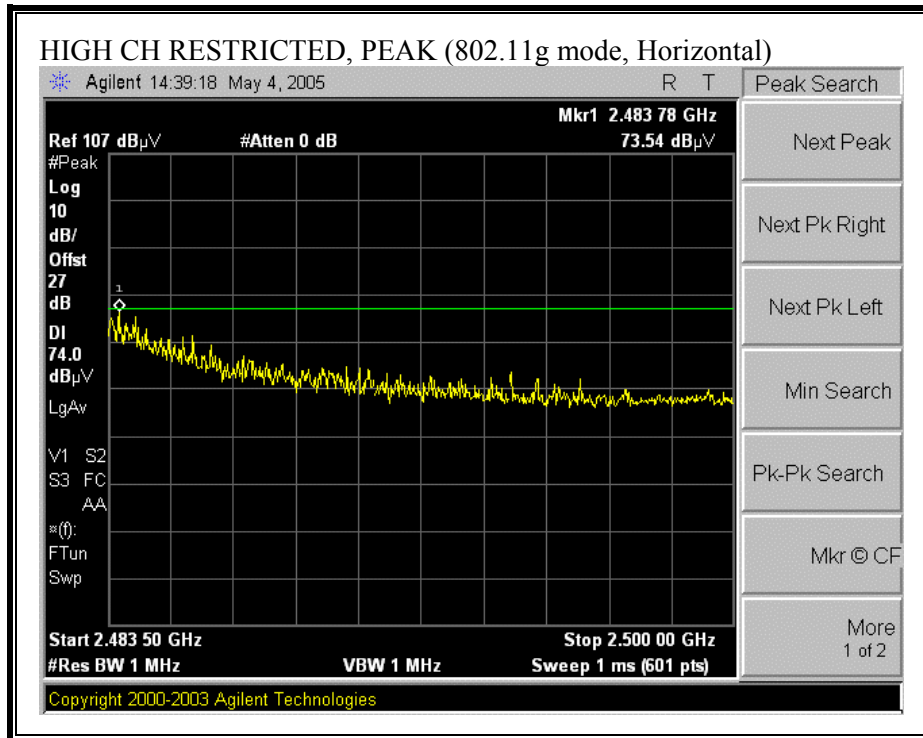


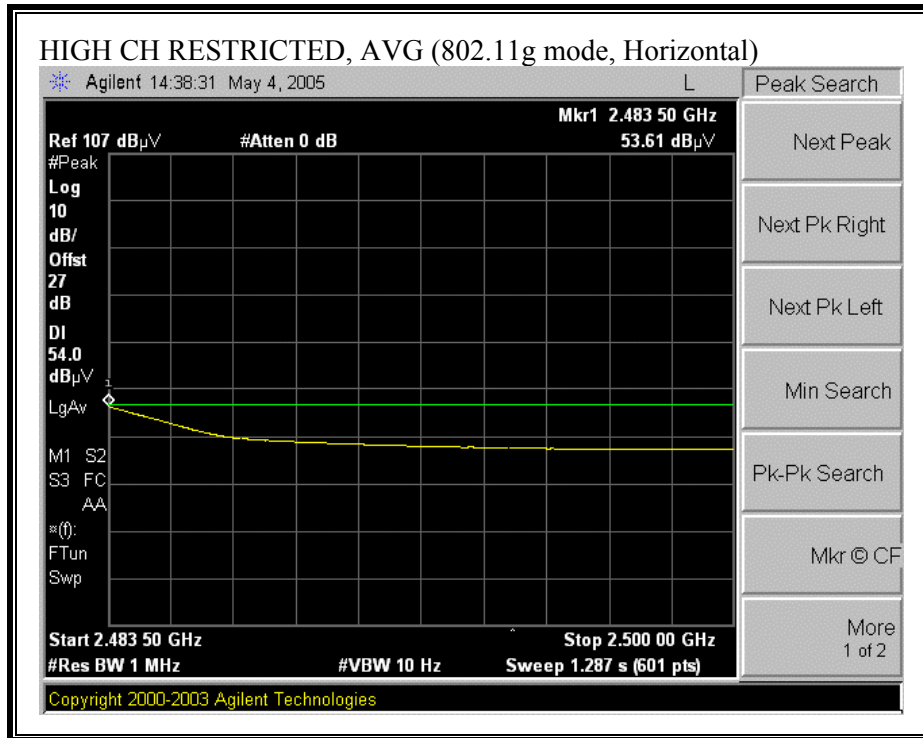
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)**



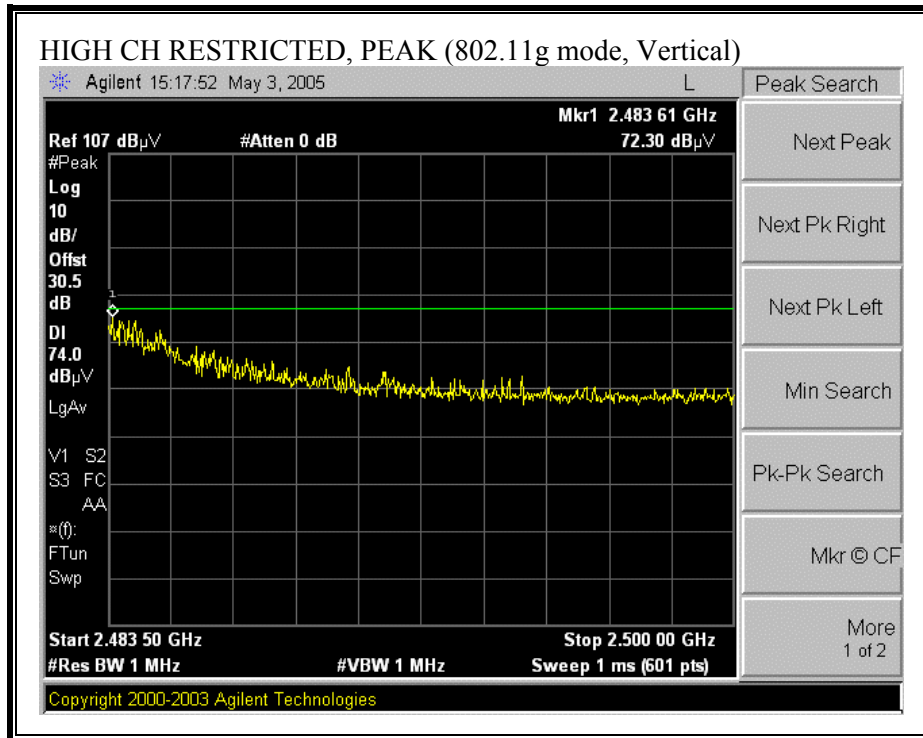


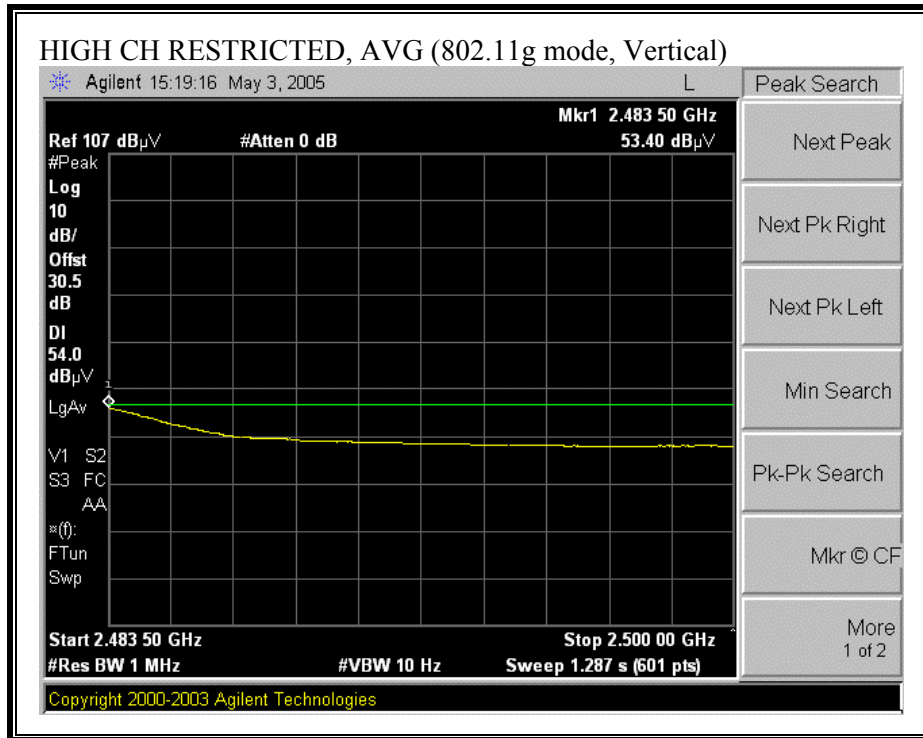
**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**





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





**HARMONICS AND SPURIOUS EMISSIONS (g MODE)**

05/02/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang  
 Project #:053427-1  
 Company: Toshiba  
 EUT Descr.:MBS1H 802.11b/g Half Size Mini-PCI WLAN Module-g Turbo ( Libretto & HTL017 Ant )  
 EUT M/N:PA3426U-1MPC (Component Changed )  
 Test Target:FCC 15.247  
 Mode Oper:TX, g mode  
 Average Power Meter: Low = 15.21 dBm, Mid = 15.05 dBm, High =15.12 dBm

**Test Equipment:**

EMCO Horn 1-18GHz T59; S/N: 3245 @3m	Pre-amplifier 1-26GHz T86 Miteq 924341	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable 4_Thanh	12 foot cable 12_Neelesh	HPF HPF_4.0GHz	Reject Filter
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**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	Fitr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Mid Ch</b>															
4.874	3.0	52.0	39.0	33.3	4.1	-44.1	0.0	0.6	45.9	32.9	74	54	-28.1	-21.1	V
7.311	3.0	57.3	42.0	35.8	5.4	-44.7	0.0	0.6	54.4	39.1	74	54	-19.6	-14.9	V
4.874	3.0	51.6	38.8	33.3	4.1	-44.1	0.0	0.6	45.5	32.7	74	54	-28.5	-21.3	H
7.311	3.0	54.0	40.0	35.8	5.4	-44.7	0.0	0.6	51.1	37.1	74	54	-22.9	-16.9	H

**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		



HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)

05/02/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang  
 Project #: 053427-1  
 Company: Toshiba  
 EUT Descrip.: MB51H 802.11b/g Half Size Mini-PCI WLAN Module-g Turbo (Libretto & HTL017 Ant)  
 EUT M/N: PA3426U-1MPC (Component Changed)  
 Test Target: FCC 15.247  
 Mode Oper: TX, g Turbo Mode  
 Average Power Meter: Mid =15.00 dBm

Test Equipment:

EMCO Horn 1-18GHz T59; S/N: 3245 @3m	Pre-amplifier 1-26GHz T86 Miteq 924341	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable 4_Thanh	12 foot cable 12 Neelesh	HPF HPF_4.0GHz	Reject Filter
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Peak Measurements  
 RBW=VBW=1MHz

Average Measurements  
 RBW=1MHz; VBW=10Hz

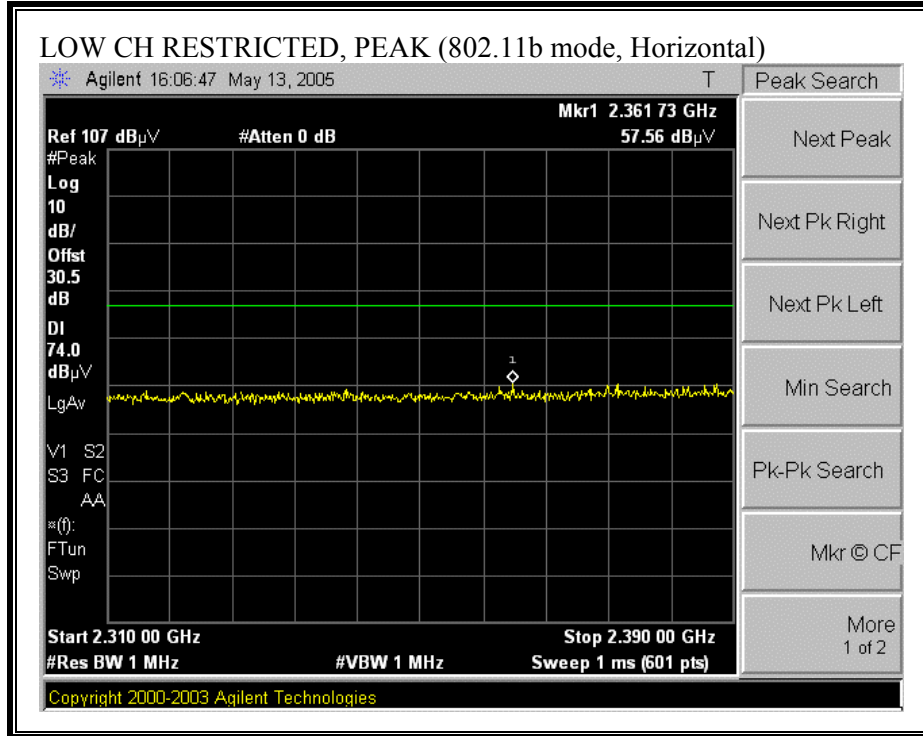
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid Ch															
4.874	3.0	50.8	38.0	33.3	4.1	-44.1	0.0	0.6	44.7	31.9	74	54	-29.3	-22.1	V
7.311	3.0	52.5	39.0	35.8	5.4	-44.7	0.0	0.6	49.6	36.1	74	54	-24.4	-17.9	V
4.874	3.0	51.0	38.3	33.3	4.1	-44.1	0.0	0.6	44.9	32.2	74	54	-29.1	-21.8	H
7.311	3.0	52.5	39.2	35.8	5.4	-44.7	0.0	0.6	49.6	36.3	74	54	-24.4	-17.7	H

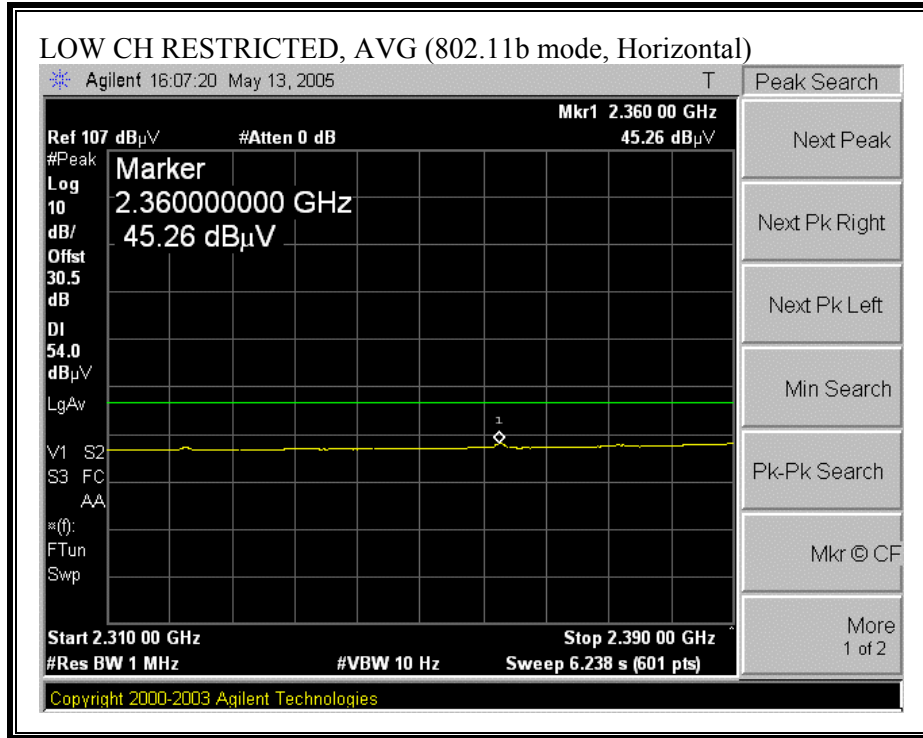
Note: No other emissions were detected above the system noise floor.

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		

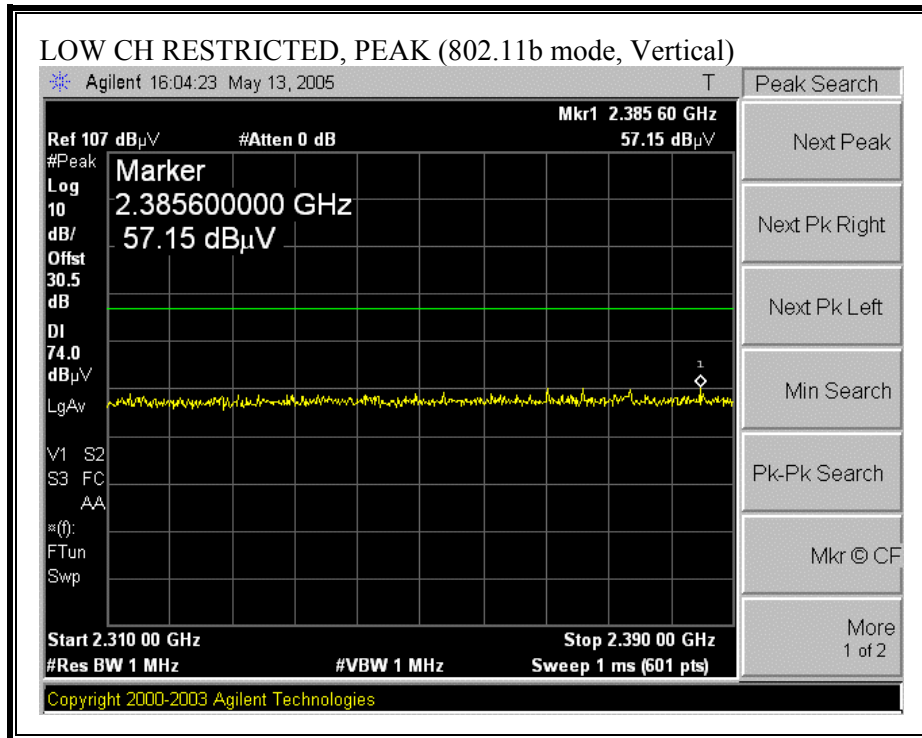
### 7.2.3. TRANSMITTER ABOVE 1 GHz (WITH LASVEGAS LAPTOP)

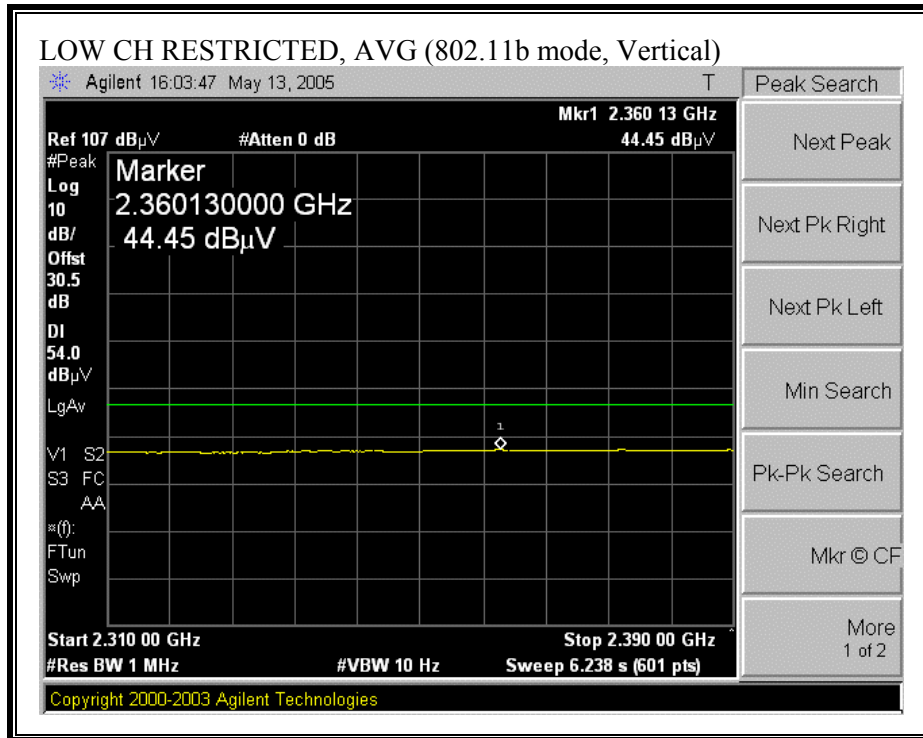
#### RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



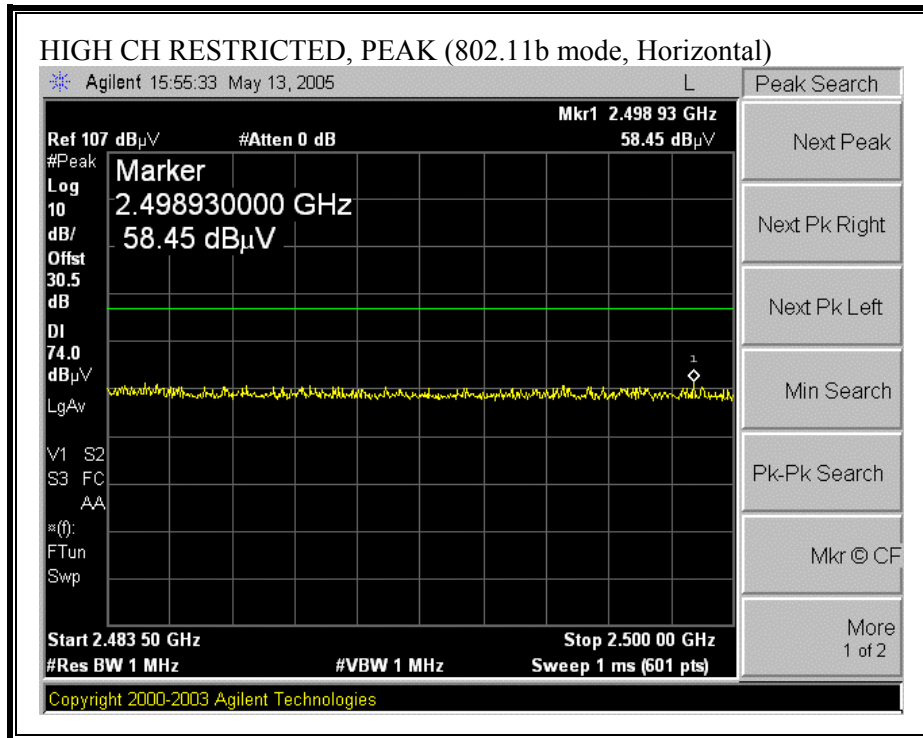


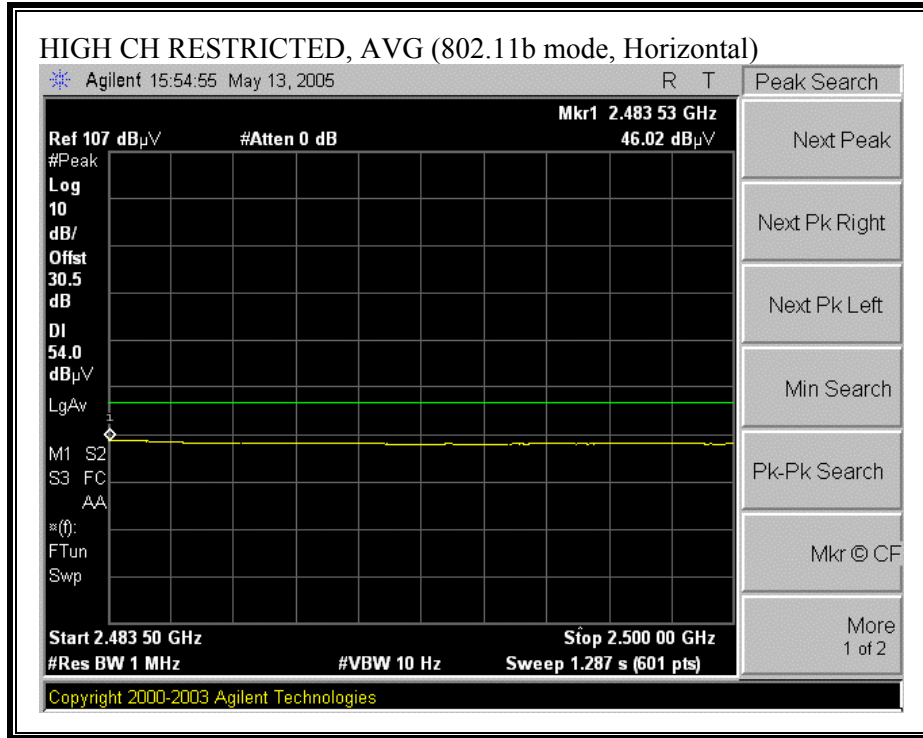
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)**



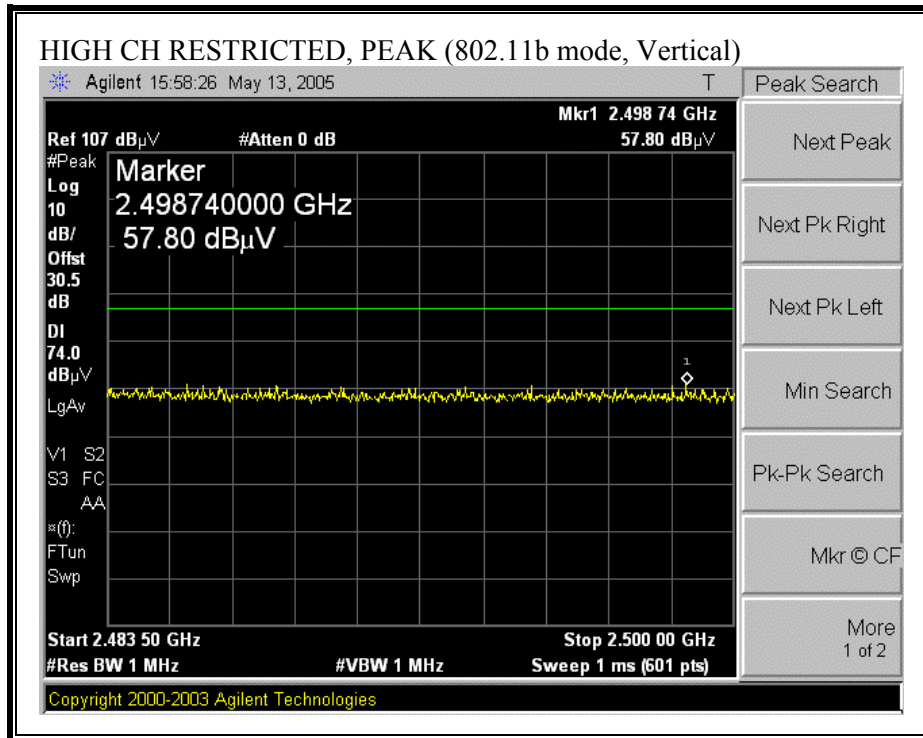


**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**

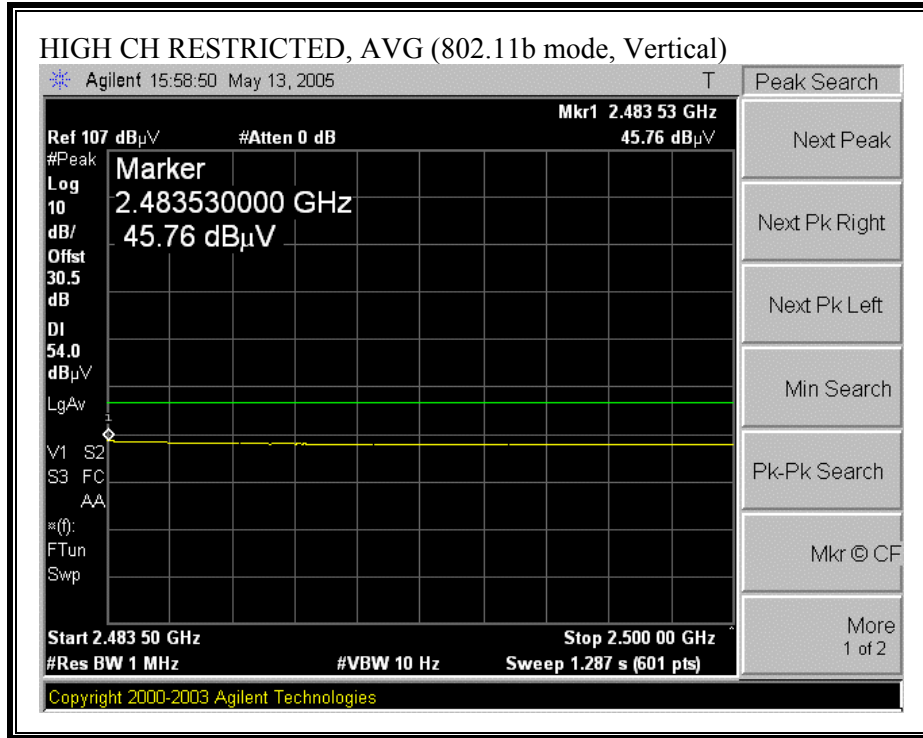




**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)**







**HARMONICS AND SPURIOUS EMISSIONS (b MODE)**

05/11/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang  
 Project #:05U3427-1  
 Company: Toshiba  
 EUT Descrip.:MBS1H 802.11 b/g Half Size Mini-PCI WLAN Module  
 EUT M/N: PA3426U ( component changed )  
 Test Target:FCC 15.247  
 Mode Oper: TX, b mode  
 Average Power Meter: Low = 16.56 dBm, Mid = 16.39 dBm, High = 16.45 dBm

Test Equipment:

EMCO Horn 1-18GHz T119; S/N: 29301 @3m	Pre-amplifier 1-26GHz T86 Miteq 924341	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable 4_Thanh	12 foot cable 12_Neelesh	HPF HPF_4.0GHz	Reject Filter
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Peak Measurements  
 RBW=VBW=1MHz

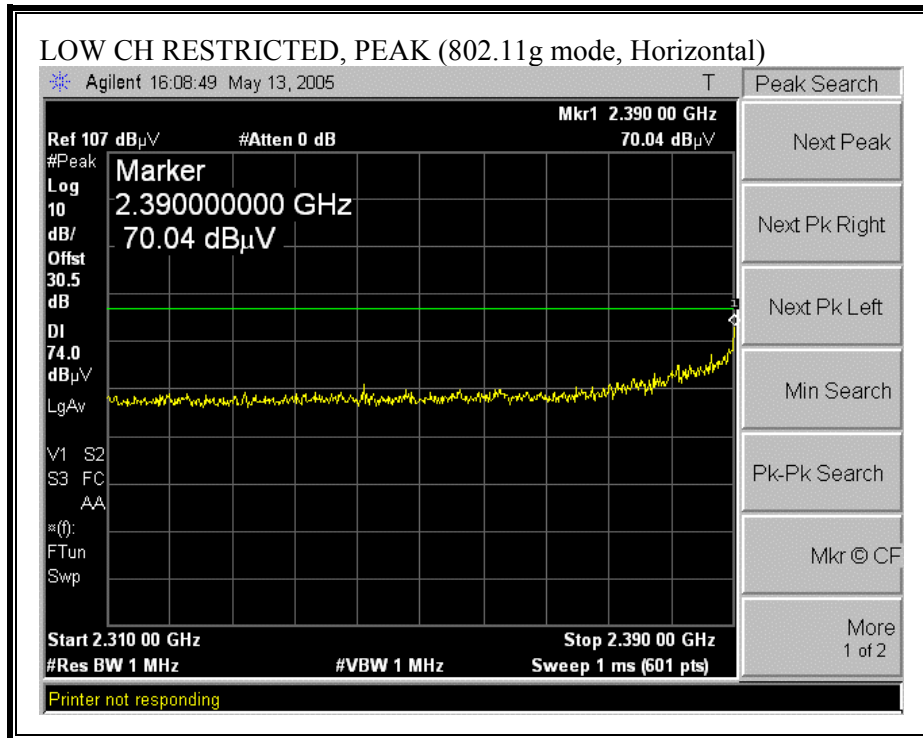
Average Measurements  
 RBW=1MHz; VBW=10Hz

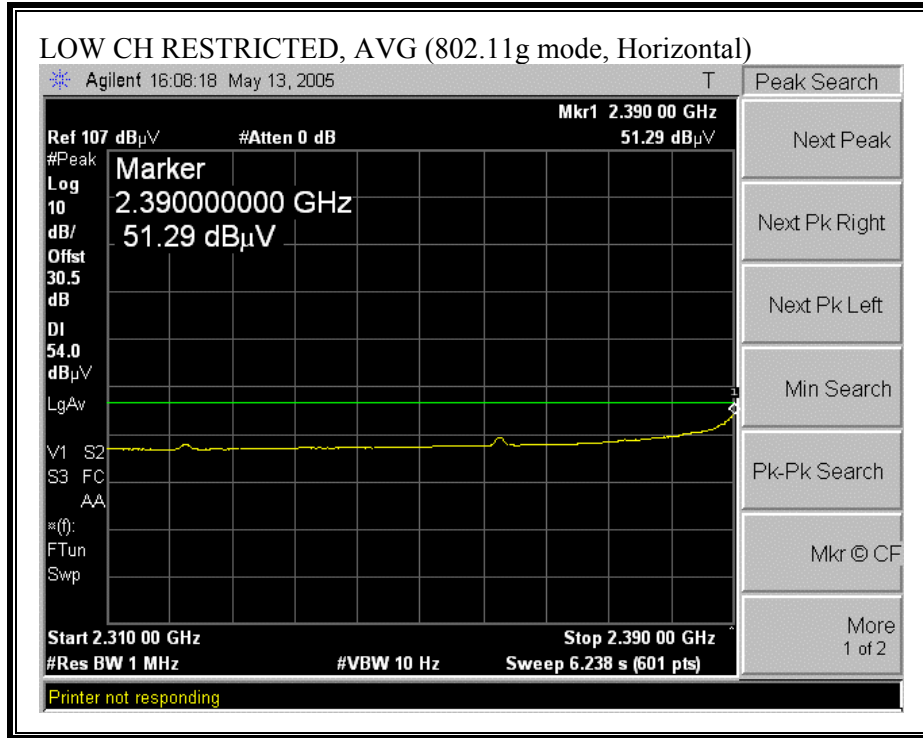
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
4.824	3.0	59.8	57.1	34.0	4.1	-44.0	0.0	0.6	54.5	51.8	74	54	-19.5	-2.2	V
4.824	3.0	50.0	44.7	34.0	4.1	-44.0	0.0	0.6	44.7	39.4	74	54	-29.3	-14.6	H
<b>Mid Ch</b>															
4.874	3.0	60.0	57.8	34.1	4.1	-44.1	0.0	0.6	54.7	52.4	74	54	-19.3	-1.6	V
7.311	3.0	55.0	44.2	35.6	5.4	-44.7	0.0	0.6	52.0	41.2	74	54	-22.0	-12.8	V
4.874	3.0	52.5	46.5	34.1	4.1	-44.1	0.0	0.6	47.2	41.2	74	54	-26.8	-12.8	H
7.311	3.0	51.0	41.0	35.6	5.4	-44.7	0.0	0.6	48.0	38.0	74	54	-26.0	-16.0	H
<b>High Ch</b>															
4.924	3.0	57.6	55.2	34.1	4.1	-44.2	0.0	0.6	52.3	49.9	74	54	-21.7	-4.1	V
7.386	3.0	53.5	41.3	35.7	5.4	-44.7	0.0	0.6	50.6	38.4	74	54	-23.4	-15.6	V
4.874	3.0	52.2	46.4	34.1	4.1	-44.1	0.0	0.6	46.9	41.1	74	54	-27.1	-12.9	H
7.386	3.0	50.4	39.8	35.7	5.4	-44.7	0.0	0.6	47.5	36.9	74	54	-26.5	-17.1	H

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

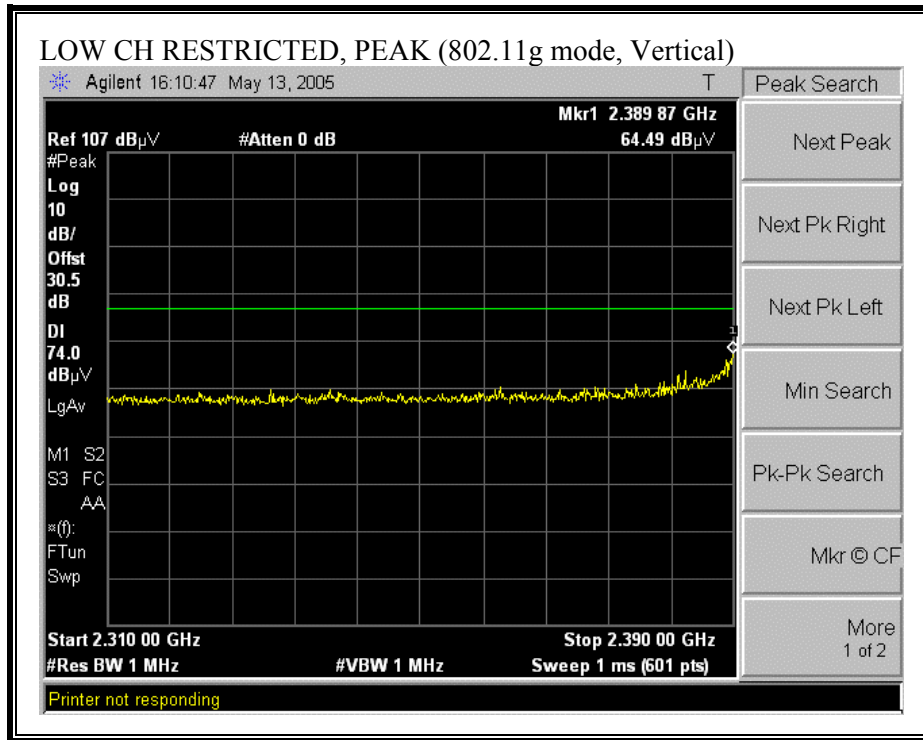
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

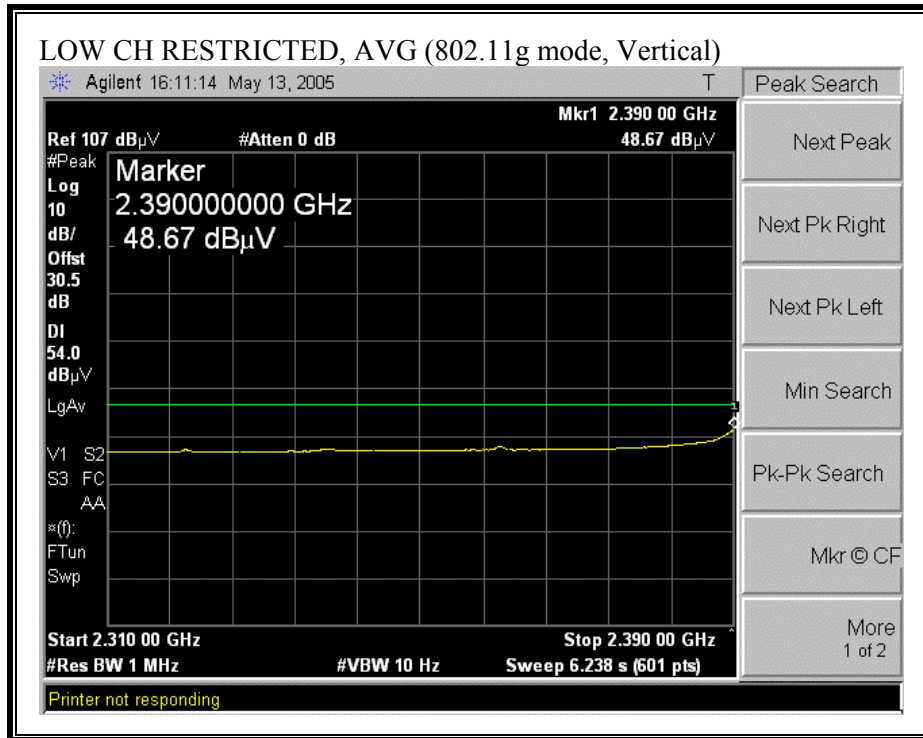
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**



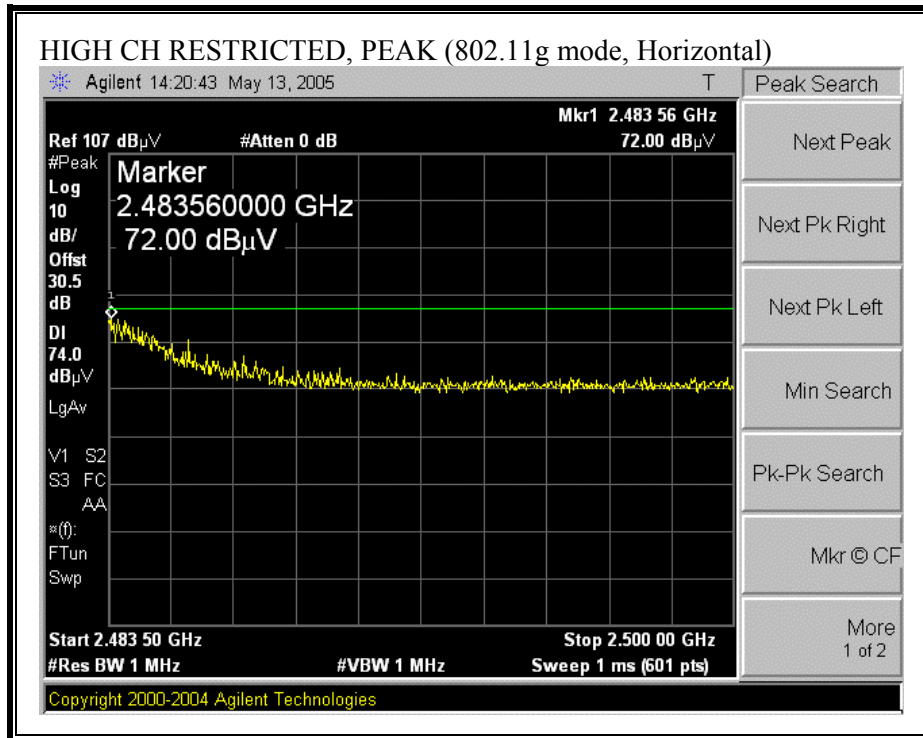


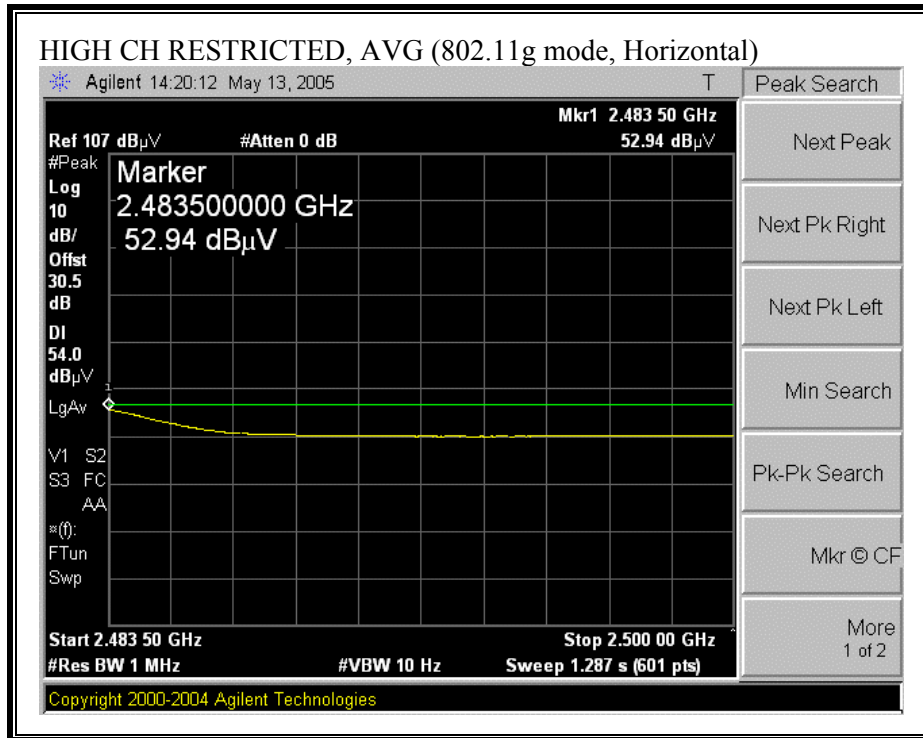
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)**





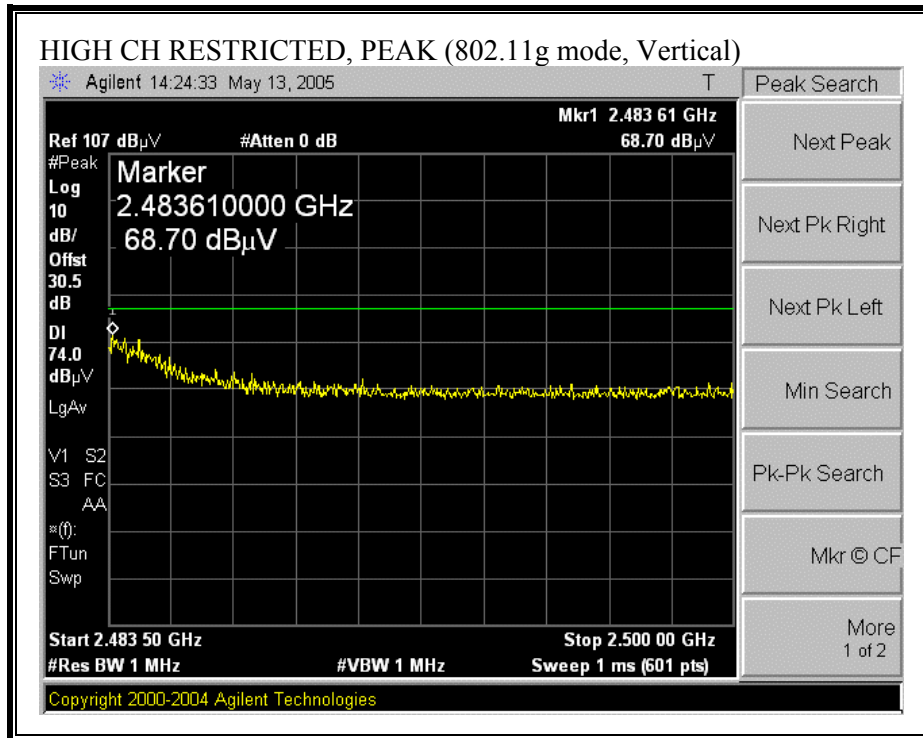
**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**

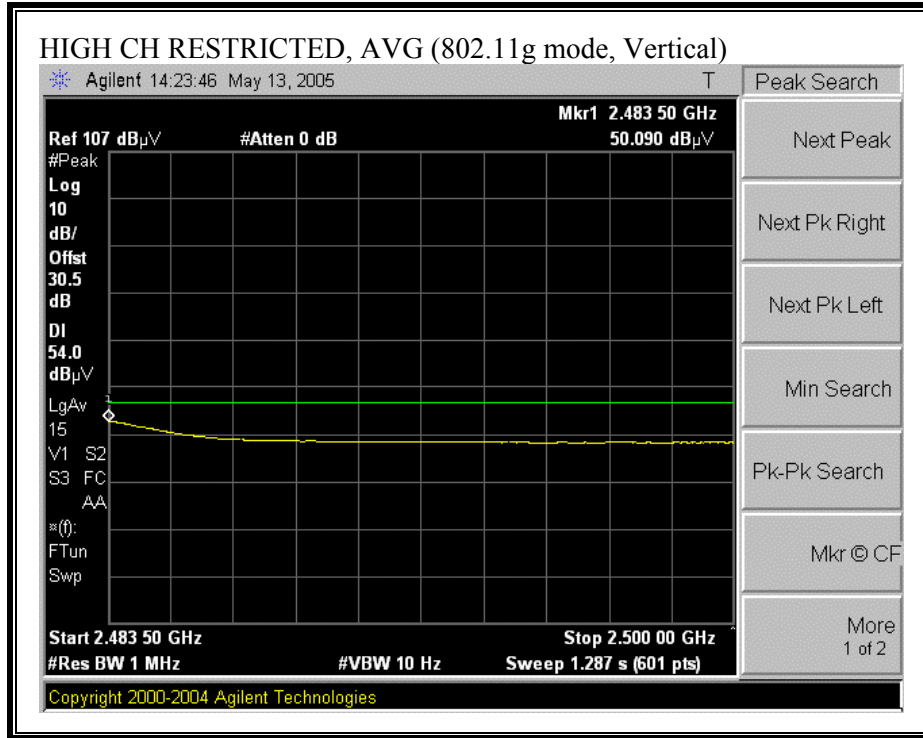






**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)**





**HARMONICS AND SPURIOUS EMISSIONS (g MODE)**

05/13/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang  
 Project #:05U3427-1  
 Company: Toshiba  
 EUT Descr.:MBS1H 802.11b/g Half Size Mini-PCI WLAN Module  
 EUT M/N: PA3426U-1MPC ( Component changed )  
 Test Target:FCC 15.247  
 Mode Oper: TX, g mode, WLAN  
 Average Power Meter: Low = 15.21 dBm, Mid = 15.05 dBm, High =15.12 dBm

Test Equipment:

EMCO Horn 1-18GHz T60; S/N: 2238 @3m	Pre-amplifier 1-26GHz T86 Miteq 924341	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable 4_Thanh	12 foot cable 12_Neelesh	HPF HPF_4.6GHz	Reject Filter
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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	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>Low Ch</b>															
4.874	3.0	52.0	39.0	33.7	4.1	-44.1	0.0	2.5	48.1	35.1	74	54	-25.9	-18.9	V
4.874	3.0	53.0	40.0	33.7	4.1	-44.1	0.0	2.5	49.1	36.1	74	54	-24.9	-17.9	H
<b>Mid ch</b>															
4.874	3.0	53.5	40.3	33.7	4.1	-44.1	0.0	2.5	49.6	36.4	74	54	-24.4	-17.6	V
7.311	3.0	51.0	37.0	36.2	5.4	-44.7	0.0	1.4	49.3	35.3	74	54	-24.7	-18.7	V
4.874	3.0	52.0	37.0	33.7	4.1	-44.1	0.0	2.5	48.1	33.1	74	54	-25.9	-20.9	H
7.311	3.0	50.0	36.5	36.2	5.4	-44.7	0.0	1.4	48.3	34.8	74	54	-25.7	-19.2	H
<b>High Ch</b>															
4.874	3.0	52.7	39.5	33.7	4.1	-44.1	0.0	2.5	48.8	35.6	74	54	-25.2	-18.4	V
7.386	3.0	53.0	37.5	36.2	5.4	-44.7	0.0	1.4	51.4	35.9	74	54	-22.6	-18.1	V
4.874	3.0	49.8	38.4	33.7	4.1	-44.1	0.0	2.5	45.9	34.5	74	54	-28.1	-19.5	H
7.386	3.0	50.2	37.0	36.2	5.4	-44.7	0.0	1.4	48.6	35.4	74	54	-25.4	-18.6	H

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		

**HARMONICS AND SPURIOUS EMISSIONS (g TURBO MODE)**

05/13/05 High Frequency Measurement  
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chun Pang  
 Project #:05U3427-1  
 Company: Toshiba  
 EUT Descr.: MB51H 802.11b/g Half Size Mini-PCI WLAN Module  
 EUT M/N: PA3426U-1MPC (Component changed)  
 Test Target: FCC 15.247  
 Mode Oper: TX, g Turbo mode, WLAN  
 Average Power Meter: Mid = 15.00 dBm

**Test Equipment:**

EMCO Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	4 foot cable	12 foot cable	HPF	Reject Filter
		4_Thank	12 Neelesh	HPF_4.6GHz	

Peak Measurements  
 RBW=VBW=1MHz

Average Measurements  
 RBW=1MHz; VBW=10Hz

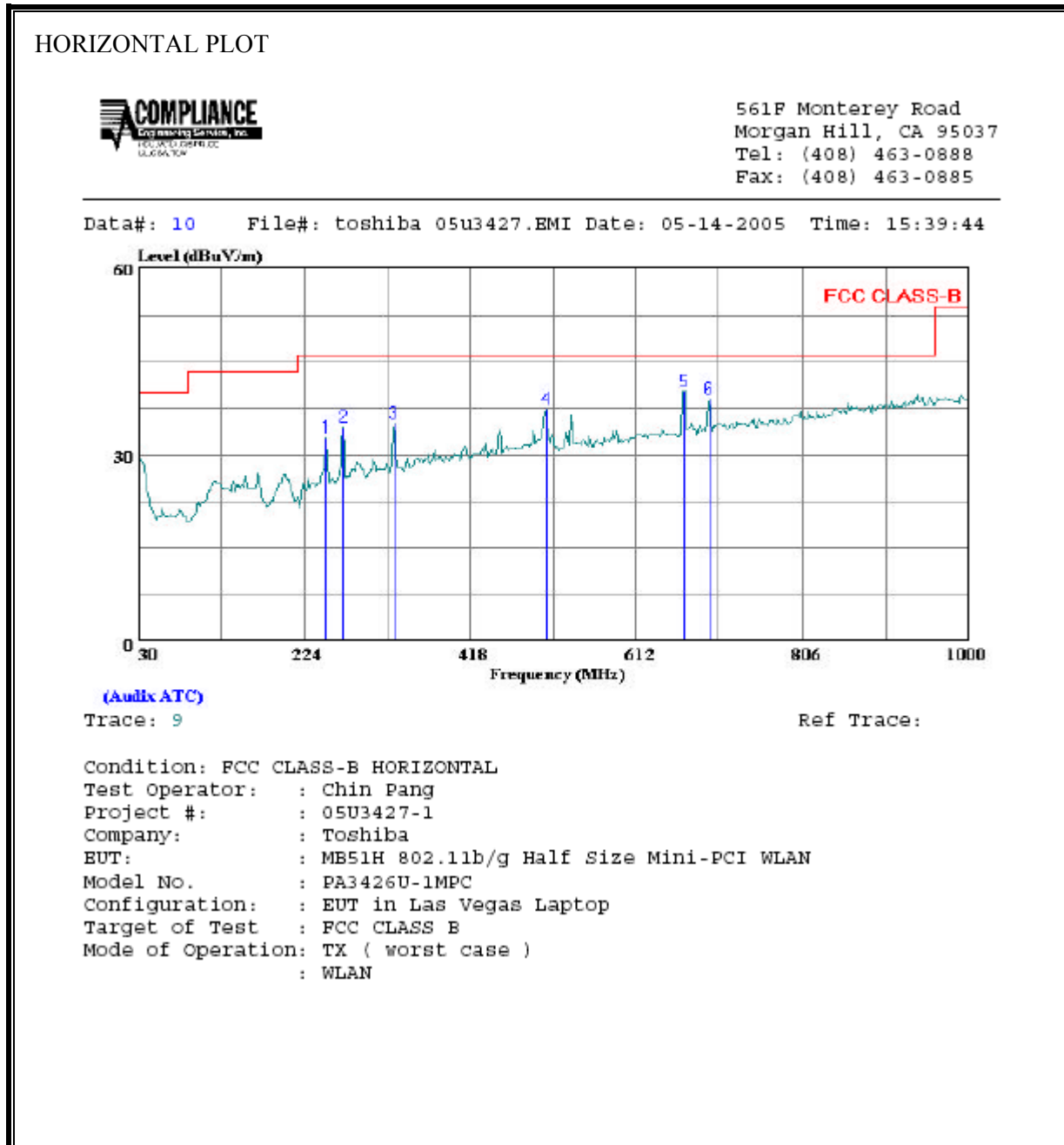
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Mid ch															
4.874	3.0	48.0	34.0	33.7	4.1	-33.5	0.0	2.5	54.7	40.7	74	54	-19.3	-13.3	V
7.311	3.0	47.2	33.7	36.2	5.4	-33.3	0.0	1.4	56.9	43.4	74	54	-17.1	-10.6	V
4.874	3.0	45.8	32.0	33.7	4.1	-33.5	0.0	2.5	52.5	38.7	74	54	-21.5	-15.3	H
7.311	3.0	44.6	31.8	36.2	5.4	-33.3	0.0	1.4	54.3	41.5	74	54	-19.7	-12.5	H

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		

### 7.2.4. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz (WITH LASVEGAS LAPTOP)

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

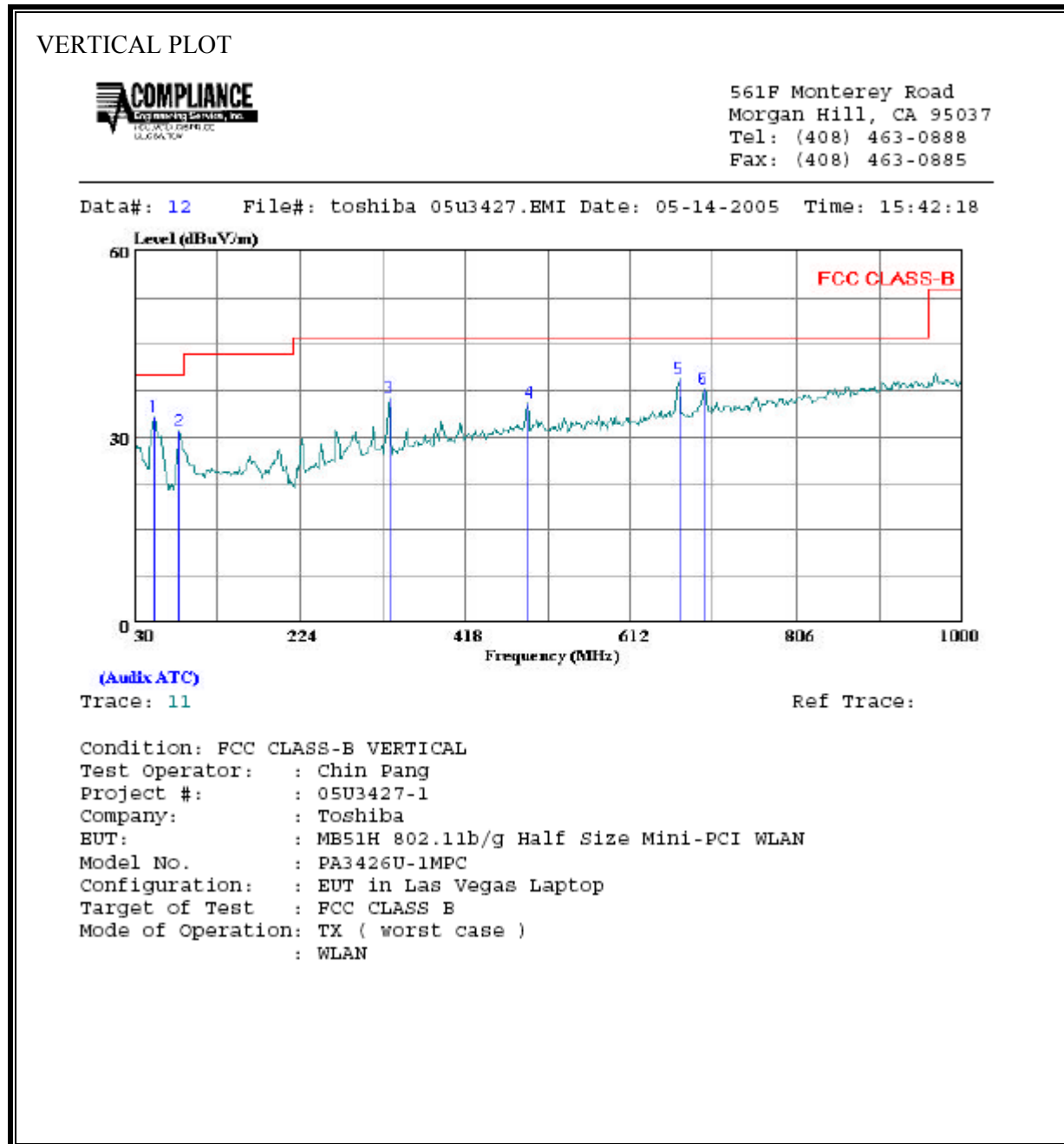


HORIZONTAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	250.190	18.84	13.90	32.74	46.00	-13.26	Peak
2	269.590	19.95	14.61	34.56	46.00	-11.44	Peak
3	329.730	18.62	16.44	35.06	46.00	-10.94	Peak
4	507.240	17.12	20.31	37.43	46.00	-8.57	Peak
5	668.260	17.68	22.66	40.34	46.00	-5.66	Peak
6	698.330	16.06	23.08	39.14	46.00	-6.86	Peak

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



VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	53.280	24.35	8.94	33.29	40.00	-6.71	Peak
2	82.380	22.27	8.60	30.87	40.00	-9.13	Peak
3	329.730	19.86	16.44	36.30	46.00	-9.70	Peak
4	492.690	15.37	20.11	35.48	46.00	-10.52	Peak
5	669.230	16.82	22.65	39.47	46.00	-6.53	Peak
6	698.330	14.65	23.08	37.73	46.00	-8.27	Peak



### 7.3. POWERLINE CONDUCTED EMISSIONS

#### 7.3.1. AC CONDUCTED SPURIOUS EMISSIONS (WITH LASVEGAS LAPTOP)

##### LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

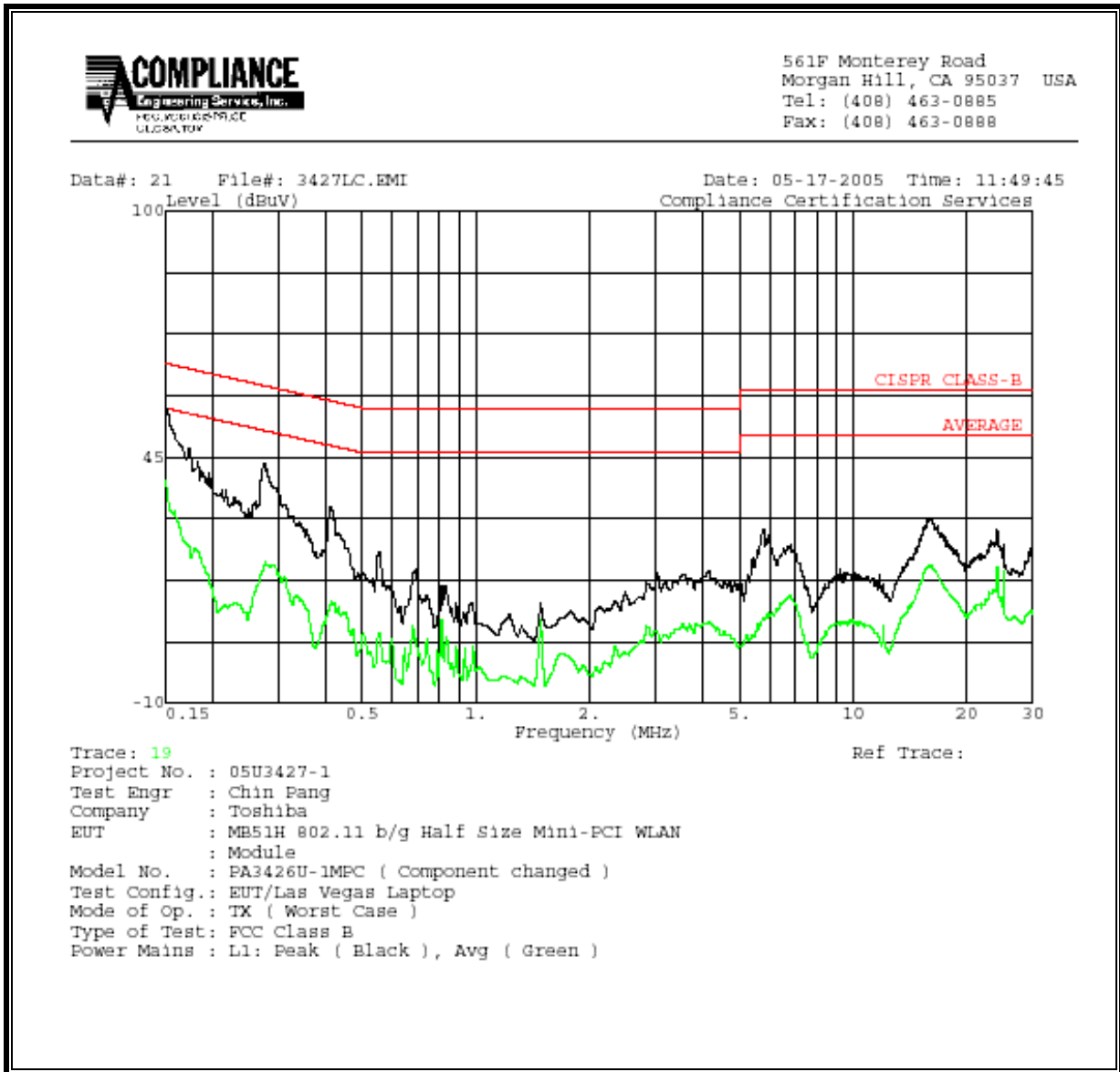
##### RESULTS

No non-compliance noted:

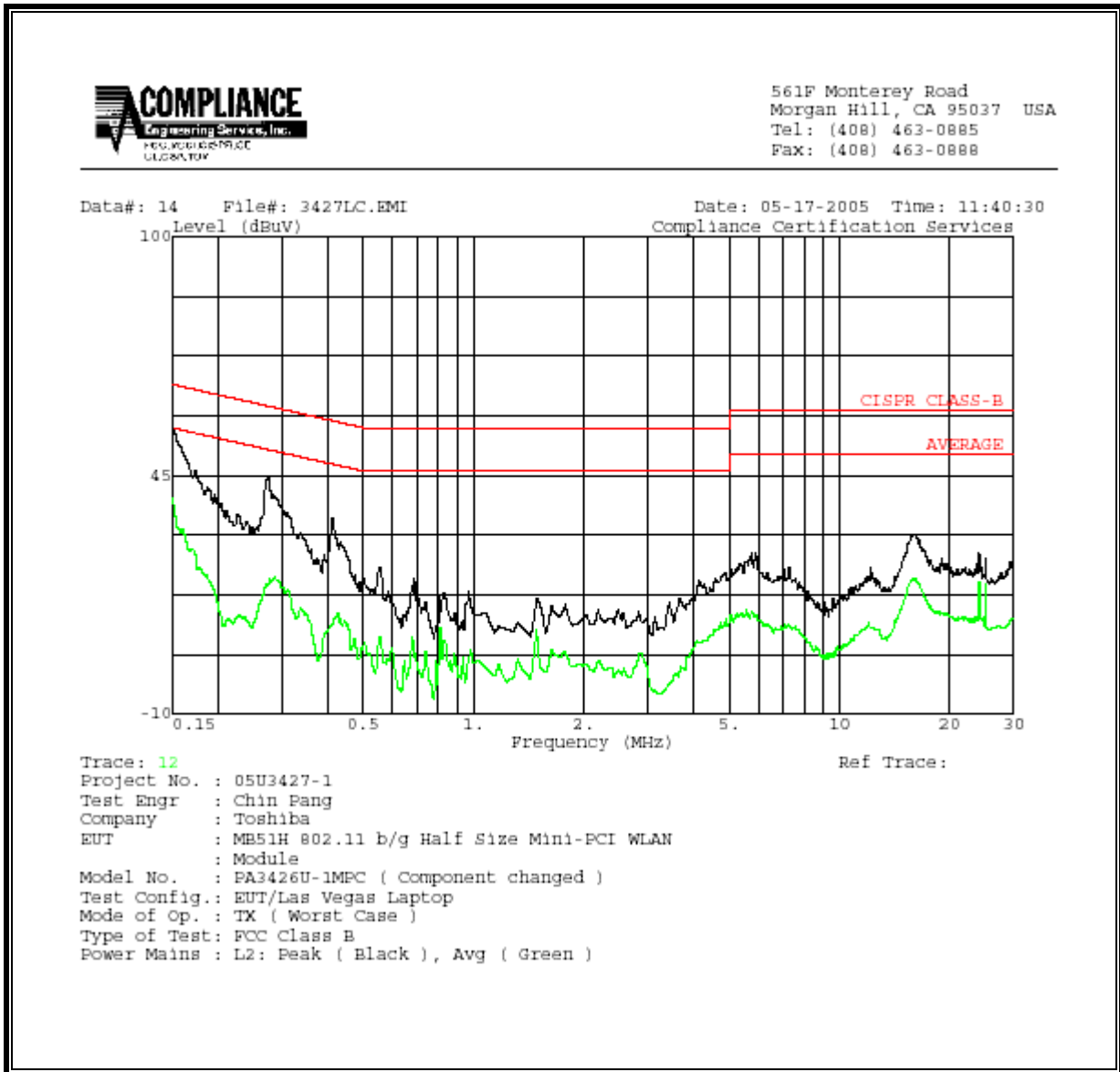
**6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	FCC B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.15	56.03	--	40.02	0.00	66.00	56.00	-9.97	-15.98	L1
0.27	43.62	--	21.94	0.00	61.03	51.03	-17.41	-29.09	L1
0.41	33.89	--	12.40	0.00	57.59	47.59	-23.70	-35.19	L1
0.15	55.86	--	39.69	0.00	66.00	56.00	-10.14	-16.31	L2
0.27	44.54	--	21.25	0.00	61.03	51.03	-16.49	-29.78	L2
0.41	35.20	--	13.20	0.00	57.59	47.59	-22.39	-34.39	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**



## 8. SETUP PHOTOS

### RADIATED RF MEASUREMENT SETUP

(LIBRETTO LAPTOP)

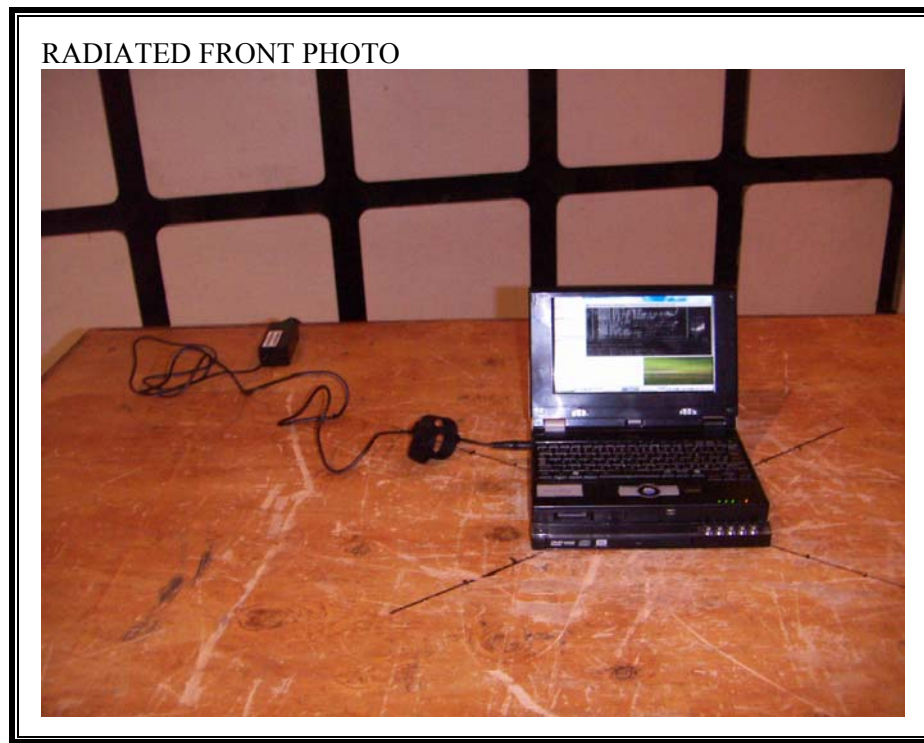


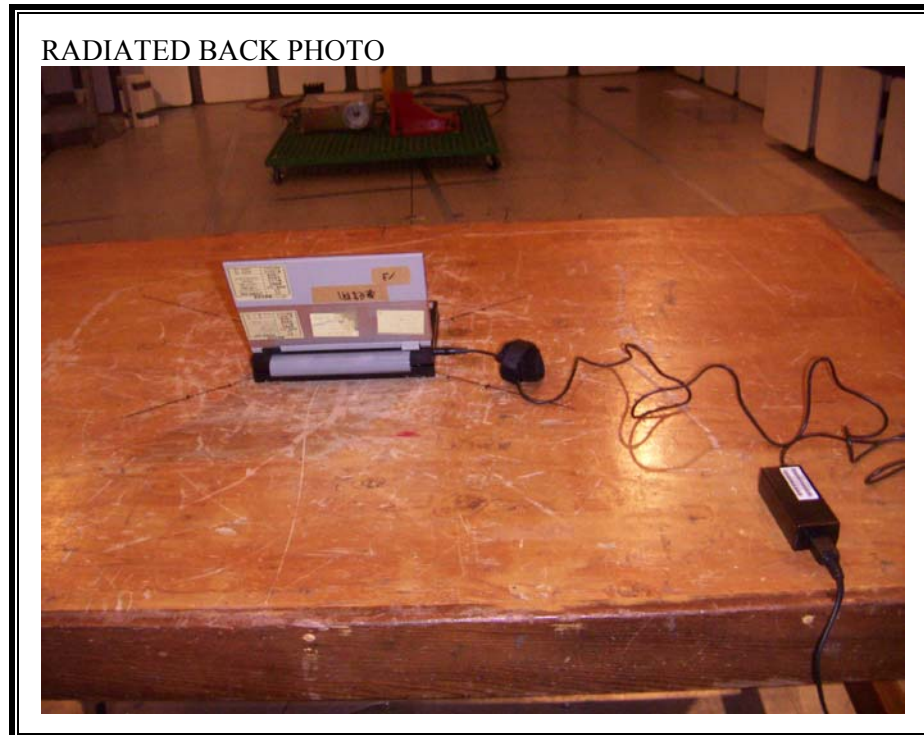
RADIATED BACK PHOTO



**RADIATED RF MEASUREMENT SETUP**

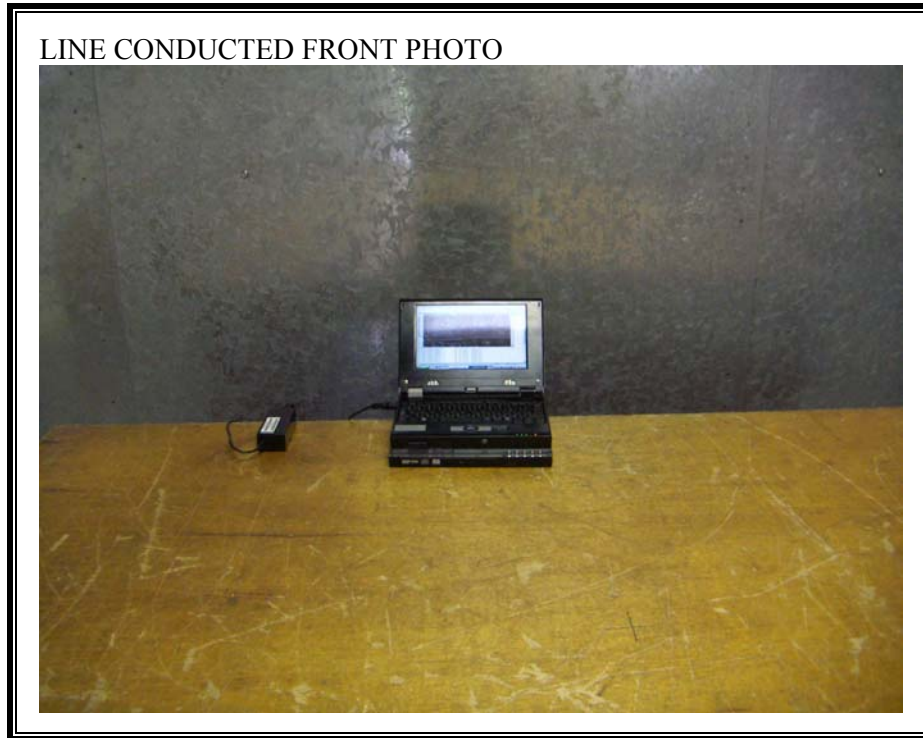
(LASVEGAS LAPTOP)

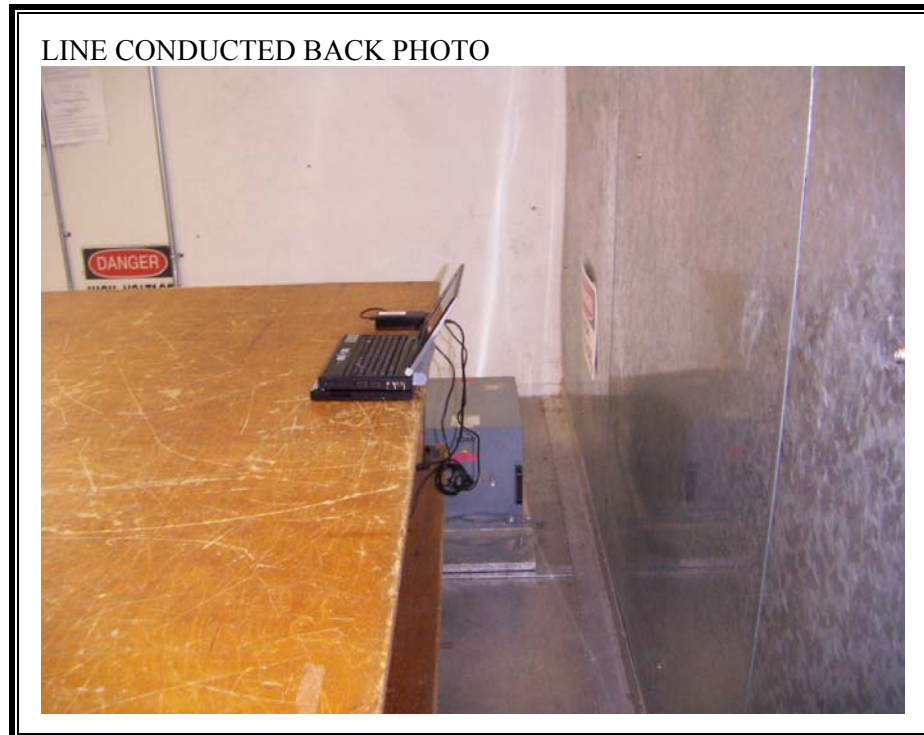






**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**





**END OF REPORT**