



**FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT**

802.11 A/G HALF SIZE MINI-PCI WLAN MODULE

MODEL NUMBER: PA3459U-1MPC; PA3461U/E-1MPC (FOR OPTION)

FCC ID: CJ6UPA3459WL

REPORT NUMBER: 05U3391-1

ISSUE DATE: MAY 25, 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**



Revision History

<u>Rev.</u>	<u>Revisions</u>	<u>Revised By</u>
-------------	------------------	-------------------

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY.....	5
4.1. MEASURING INSTRUMENT CALIBRATION.....	5
4.2. MEASUREMENT UNCERTAINTY.....	5
5. EQUIPMENT UNDER TEST.....	6
5.1. DESCRIPTION OF EUT	6
5.2. MAXIMUM OUTPUT POWER	6
5.3. MANUFACTURER'S DESCRIPTION OF MODEL DIFFERENCES.....	6
5.4. DESCRIPTION OF AVAILABLE ANTENNAS.....	7
5.5. SOFTWARE AND FIRMWARE	7
5.6. WORST-CASE CONFIGURATION AND MODE.....	7
5.7. DESCRIPTION OF TEST SETUP	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. LIMITS AND RESULTS	11
7.1. CHANNEL TEST.....	11
7.1.1. AVERAGE POWER.....	11
7.2. RADIATED EMISSIONS.....	12
7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS	12
7.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND	15
7.2.3. TRANSMITTER ABOVE 1 GHz FOR 5725 TO 5850 MHz BAND	33
7.2.4. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz	34
7.3. POWERLINE CONDUCTED EMISSIONS	46
8. SETUP PHOTOS	54

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: 802.11A/G HALF SIZE MINI-PCI WLAN MODULE

MODEL: PA3459U-1MPC; PA3461U/E-1MPC (FOR OPTION)

SERIAL NUMBER: 1152T000018

DATE TESTED: MAY 09 - 19, 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.

Note: The 2.4 and 5.8 GHz bands are applicable to this report; other band of operation 5.2 GHz is documented in a separate report.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

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 802.11a/b/g transceiver Module

The radio module is manufactured by Atheros Communications.

The EUT module is installed and tested inside the Las Vegas Laptop, so additional tests 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.: 05U3390-1.

5.2. 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	21.01	126.18
2412 - 2462	802.11g	23.06	202.30

5725 to 5850 MHz Authorized Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	22.47	176.60

5.3. MANUFACTURER'S DESCRIPTION OF MODEL DIFFERENCES

The two modules are identical and only different in model number.

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. HTL017 - 4.12 dBi at 5.8GHz without cable loss;
3. HTL008 - 2.89 dBi at 2.4GHz without cable loss;
4. TIAN01 - 4.66 dBi at 5.2GHz without cable loss.

The HTL017 antenna, which has the highest gain of 2.4GHz and 5.8GHz bands; also the TIAN01 antenna, which has the highest gain of 5.2GHz bands, so both antennas represent 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” ART

5.6. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest average output power. The highest measured average output powers were at 2412 MHz for b/g mode, 5320 MHz for a mode (UNII), and 5745 MHz for a mode (DTS).

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Toshiba	PA24404	0110C1123893	NA
Laptop	Toshiba Las Vegas	PLU10N-AAA14	04B-0619	DoC

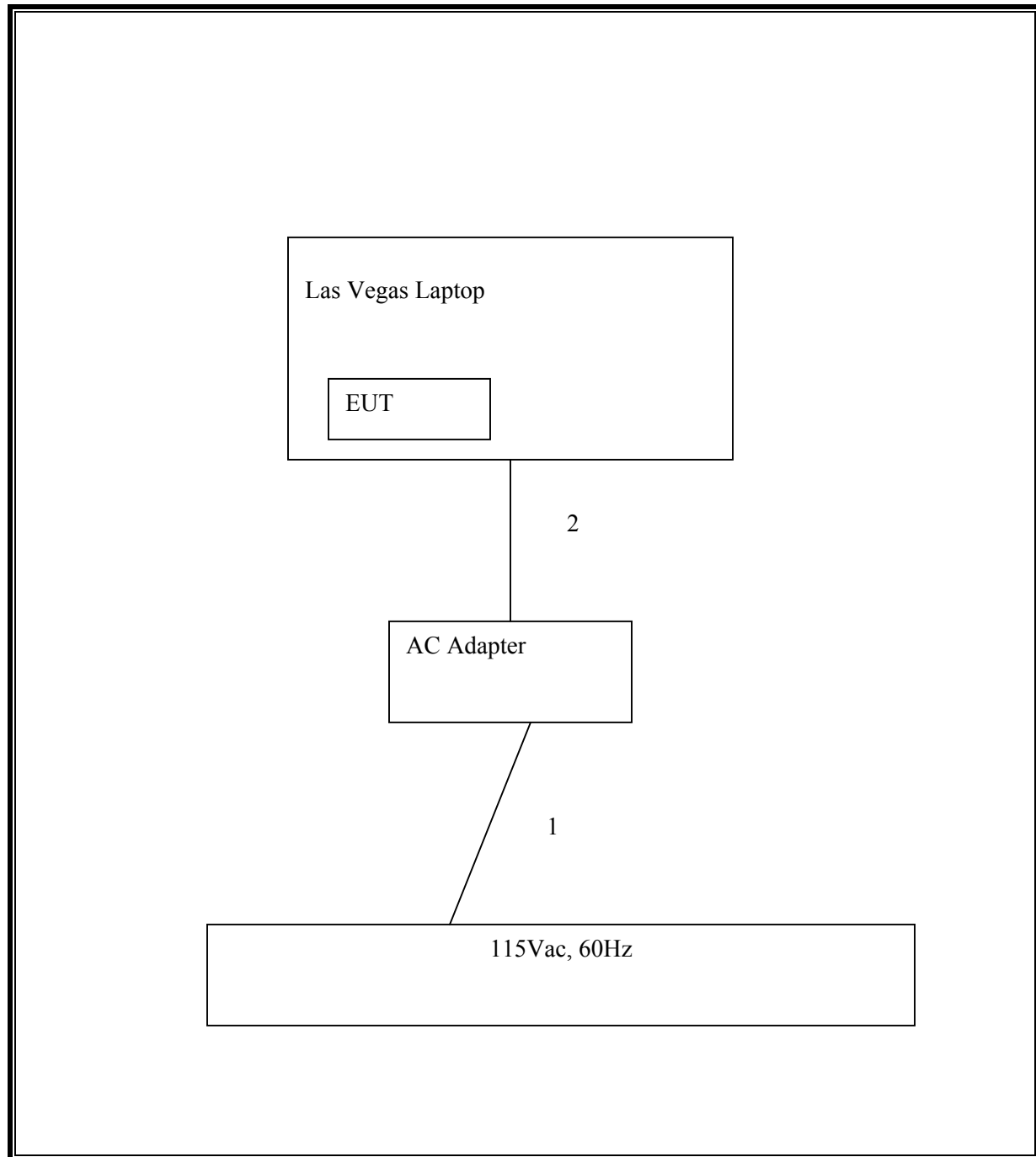
I/O CABLES

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. 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
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	8/30/2005
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/21/2005
Spectrum Analyzer	HP	E4446A	US42510266	8/25/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3117	29310	9/12/2005
4.0 High Pass Filter	Micro Tronics	HPM13351	1	CNR
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924342	8/17/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	9/12/2005
30MHz---- 2Ghz	Sunol Sciences	JB1 Antenna	A121003	9/12/2005
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	3/6/2006
RF Filter Section	HP	85420E	3705A00256	3/6/2006
Peak Power Meter	Agilent	E4416A	GB41291160	2/9/06
Peak / Average Power Sensor	Agilent	E9327A	US40440755	2/10/06
Preamplifier, 1 ~ 26.5 GHz	HP	8449B	3008A00369	8/17/05
Antenna, Horn 18 ~ 26 GHz	ARA	SWH-28	1007	9/12/05
7.6 High Pass Filter	Micro Tronics	HPM13195	2	CNR

7. LIMITS AND RESULTS

7.1. CHANNEL TEST

7.1.1. 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 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	18.25
Middle	2437	18.00
High	2462	18.13

802.11g Mode

Channel	Frequency (MHz)	Power (dBm)
Low	2412	16.06
Middle	2437	16.24
High	2462	15.90

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5745	15.07
Middle	5785	15.10
High	5825	15.20

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
¹ 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	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² 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.

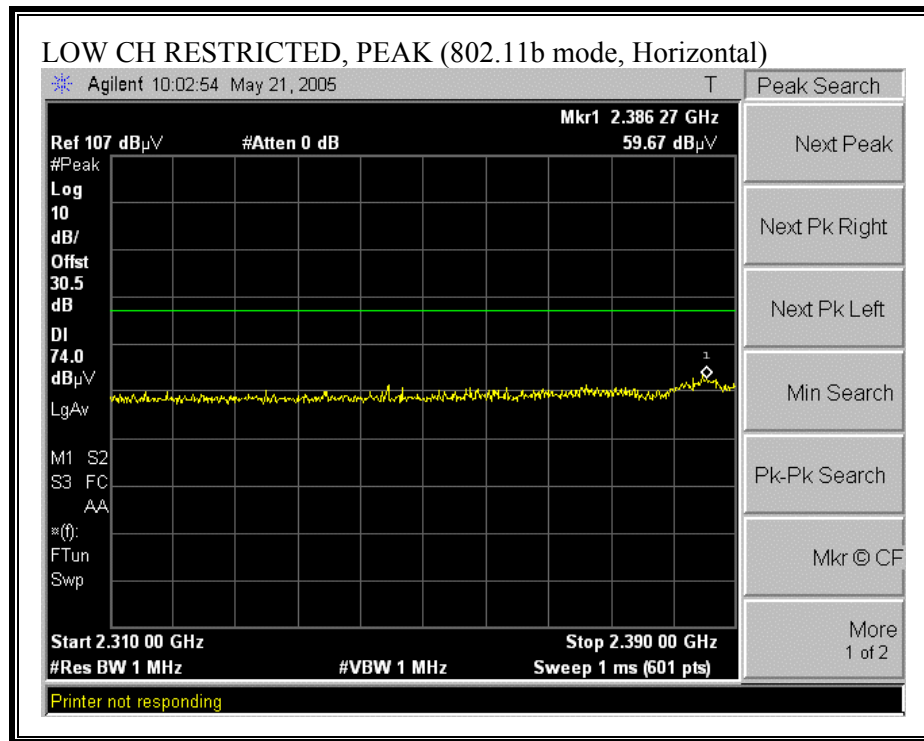
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

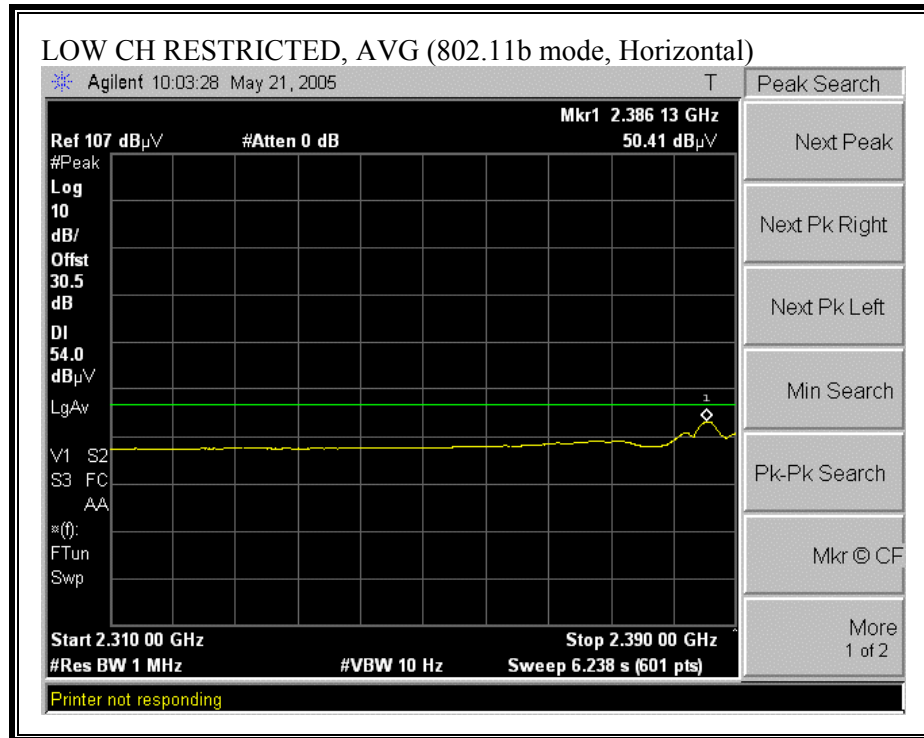
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

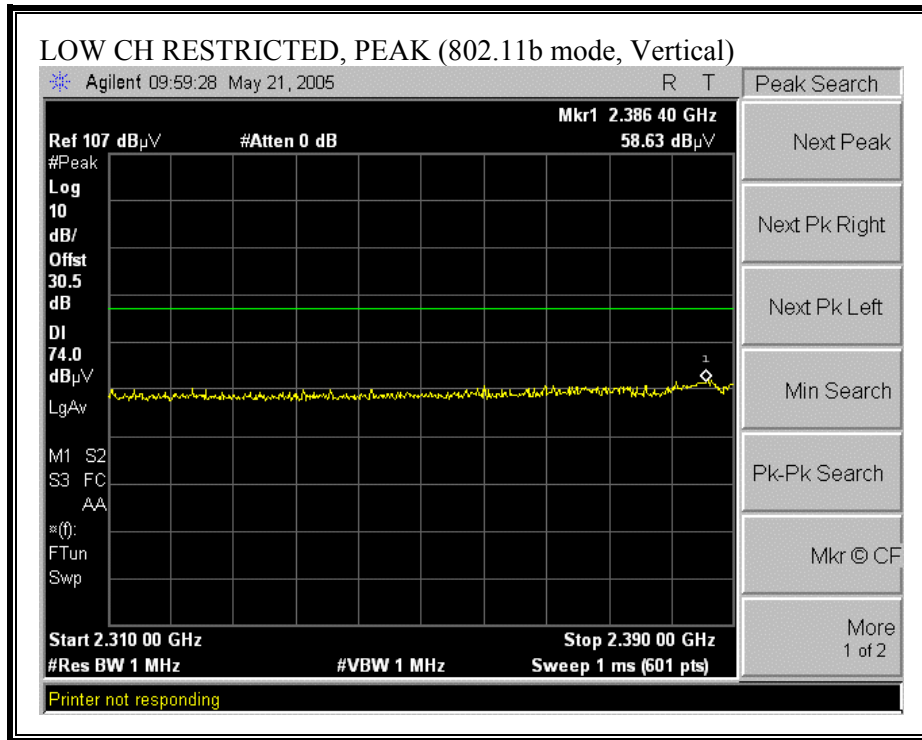
7.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

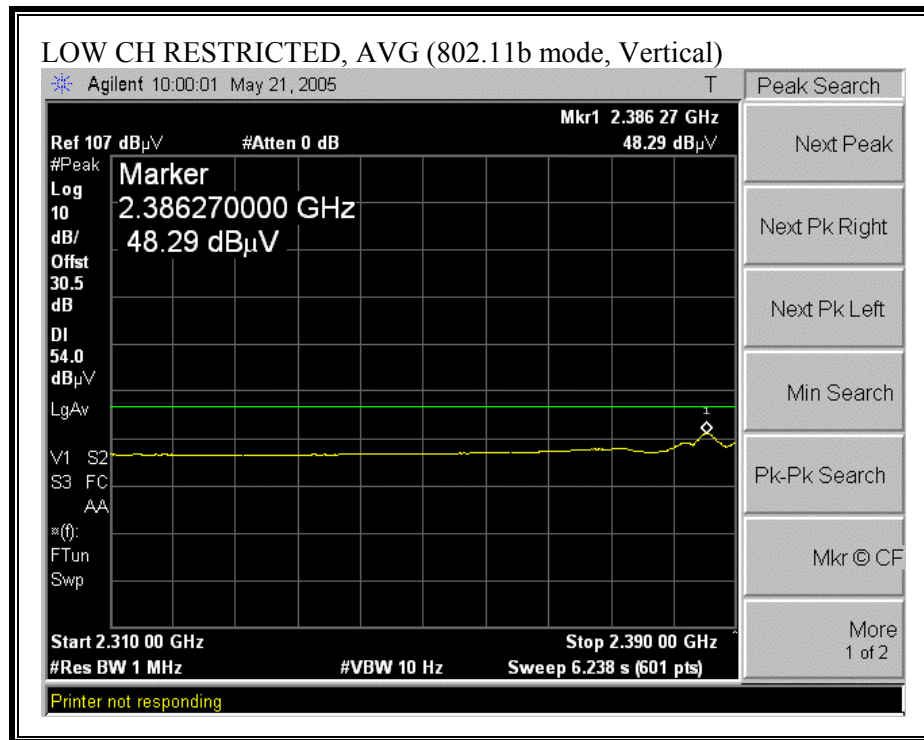
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



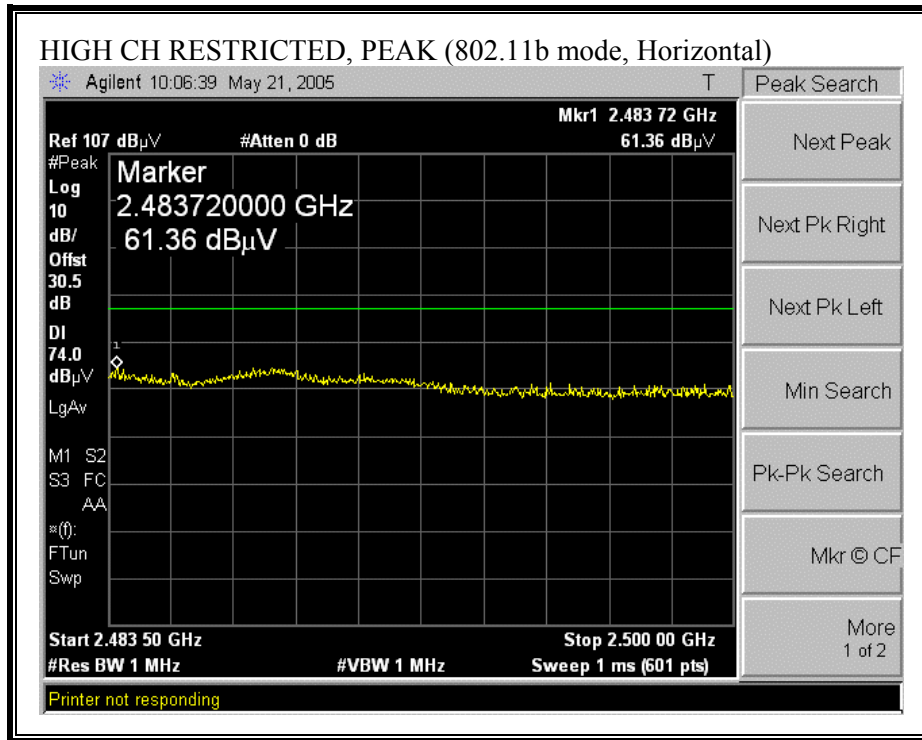


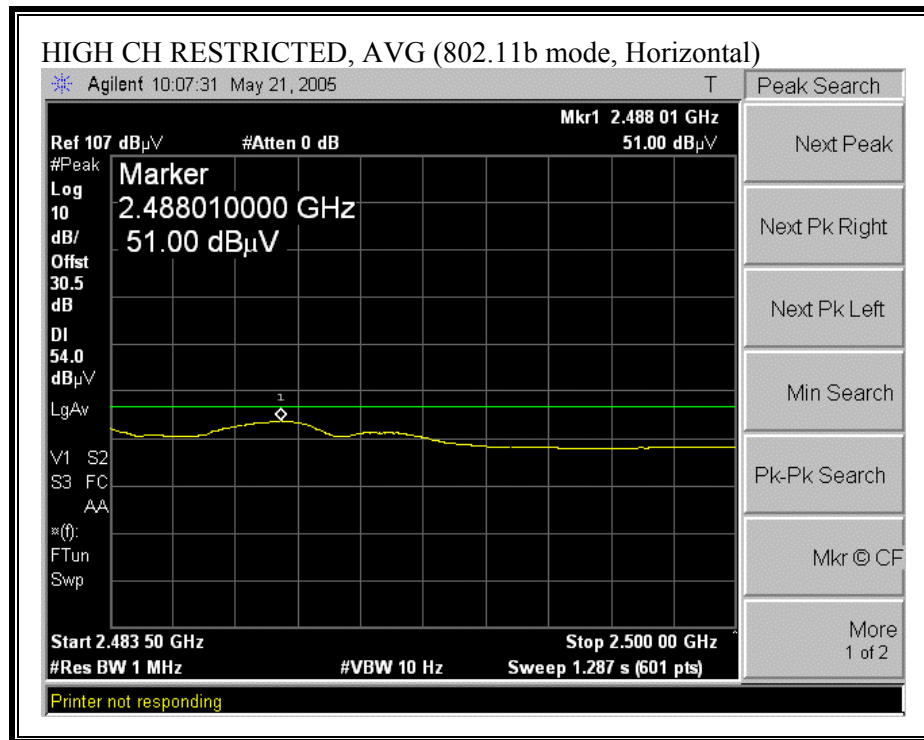
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



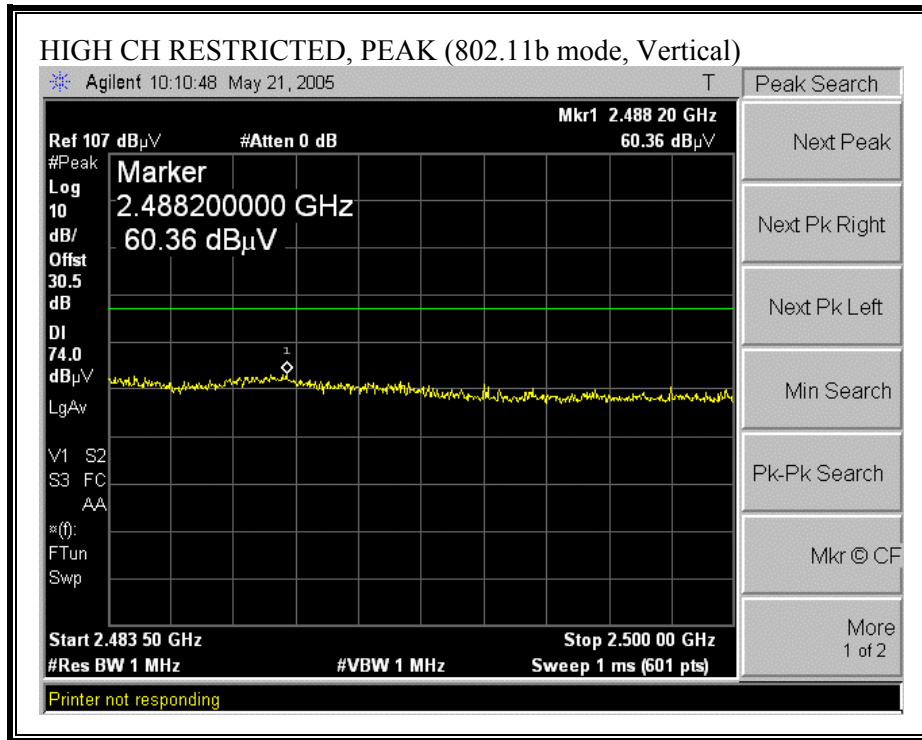


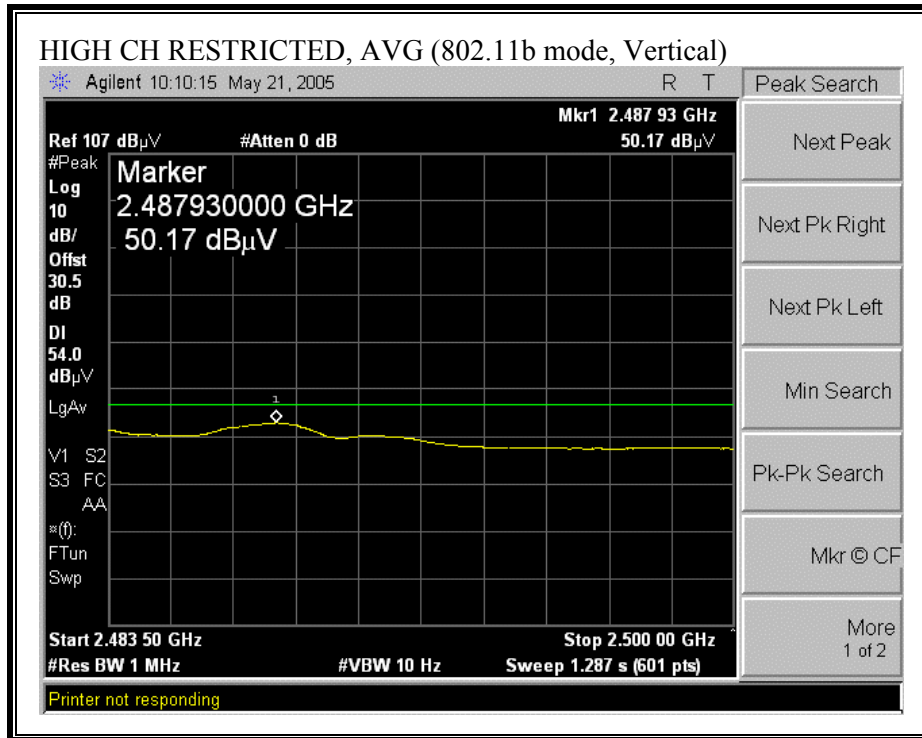
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)

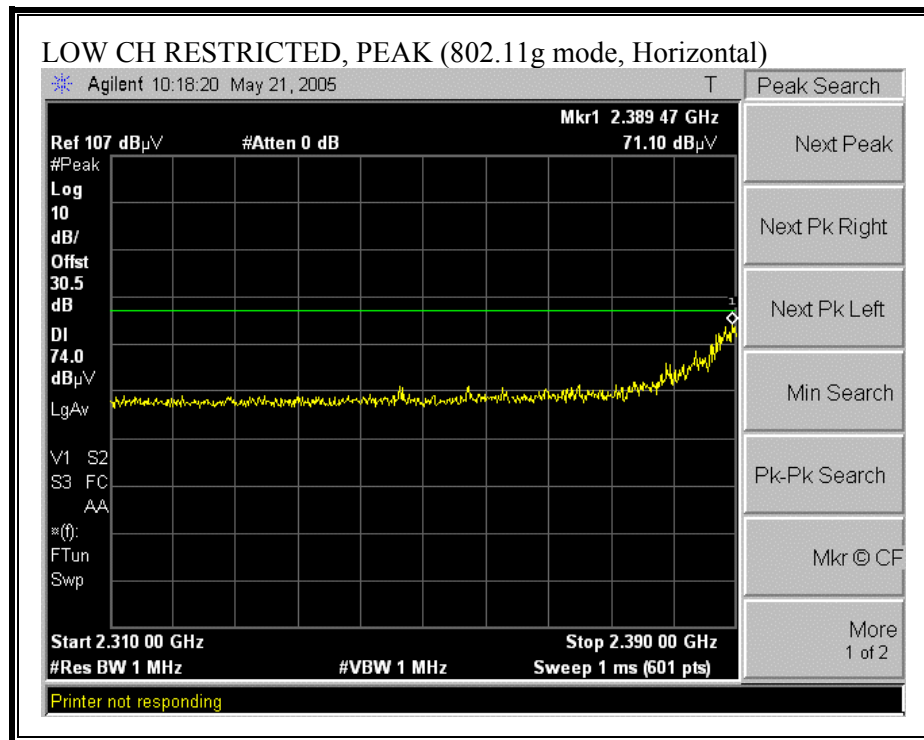


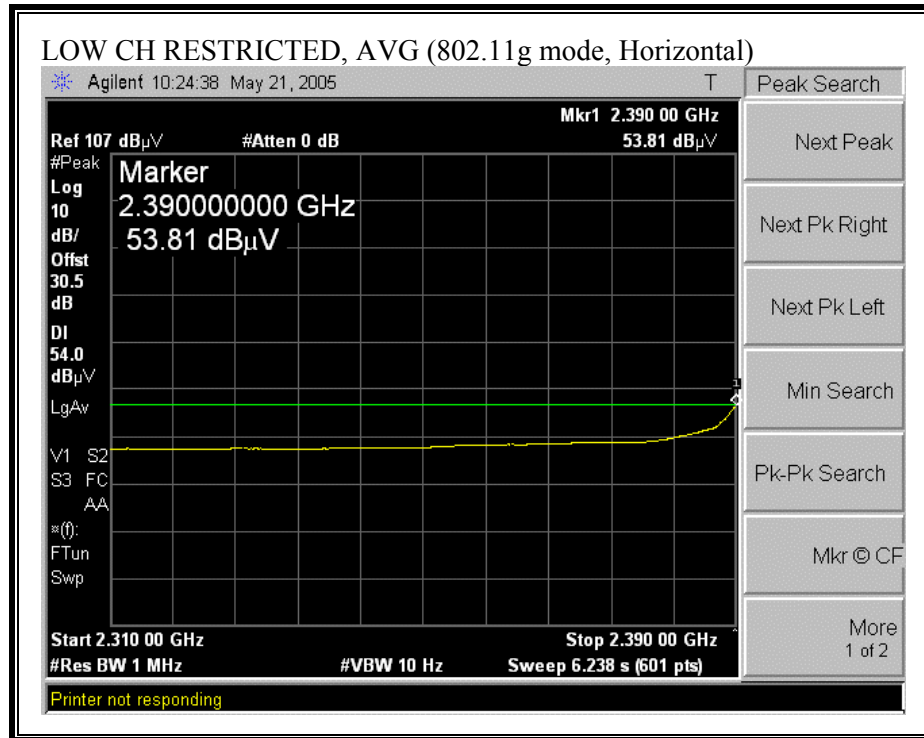


HARMONICS AND SPURIOUS EMISSIONS (b MODE)

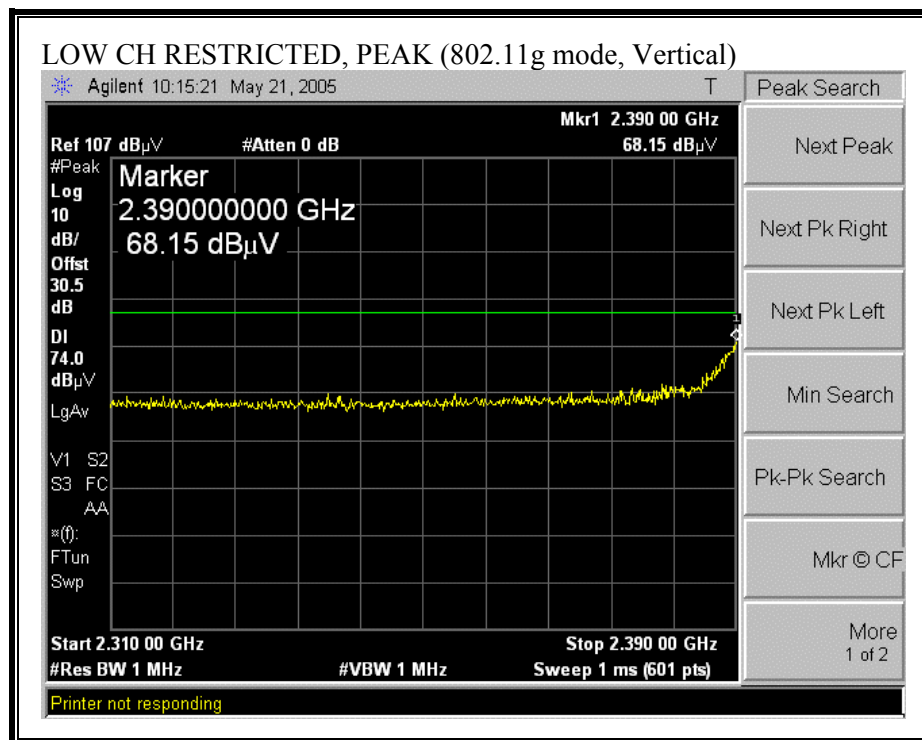
05/21/05 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: Chin Pang Project #: 05U3391-1 Company: Toshiba EUT Descrip.: 802.11 a/b/g MB62HL Half-Size Mini-PCI WLAN Module with Antenna HTL017 EUT M/N: PA-3459U-1MPC Test Target: FCC 15.247 Mode Oper: Tx, b mode															
Test Equipment:															
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit FCC 15.205							
Hi Frequency Cables				HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz							
2 foot cable		3 foot cable		4 foot cable		12 foot cable		HPF_4.0GHz		Reject Filter					
4_Thanh		12_Neelesh													
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.824	3.0	55.6	50.0	33.7	4.1	-44.5	0.0	0.6	49.5	43.9	74	54	-24.5	-10.1	V
4.824	3.0	52.8	47.0	33.7	4.1	-44.5	0.0	0.6	46.7	40.9	74	54	-27.3	-13.1	H
mid ch															
4.874	3.0	54.5	48.7	33.8	4.1	-44.5	0.0	0.6	48.4	42.6	74	54	-25.6	-11.4	V
7.311	3.0	51.0	38.0	35.5	5.4	-43.6	0.0	0.6	48.9	35.9	74	54	-25.1	-18.1	V
4.874	3.0	52.0	46.7	33.8	4.1	-44.5	0.0	0.6	45.9	40.6	74	54	-28.1	-13.4	H
7.311	3.0	50.5	37.6	35.5	5.4	-43.6	0.0	0.6	48.4	35.5	74	54	-25.6	-18.5	H
High ch															
4.924	3.0	56.6	52.0	33.8	4.1	-44.6	0.0	0.6	50.6	46.0	74	54	-23.4	-8.0	V
7.386	3.0	52.0	38.2	35.6	5.4	-43.6	0.0	0.6	50.1	36.3	74	54	-23.9	-17.7	V
4.924	3.0	53.0	47.5	33.8	4.1	-44.6	0.0	0.6	47.0	41.5	74	54	-27.0	-12.5	H
7.386	3.0	51.2	37.8	35.6	5.4	-43.6	0.0	0.6	49.3	35.9	74	54	-24.7	-18.1	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										

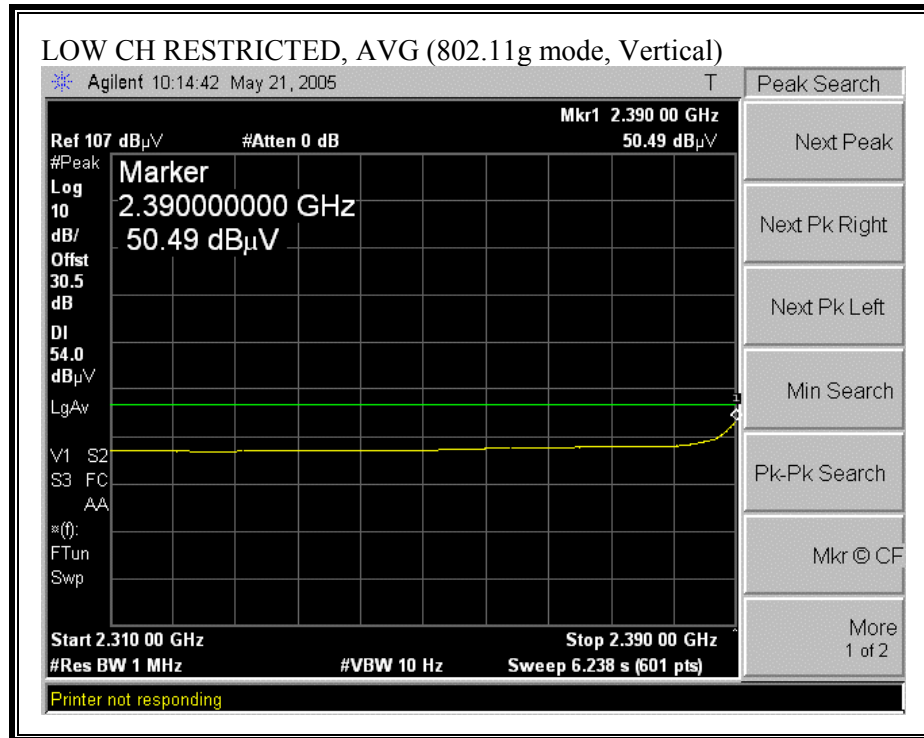
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)



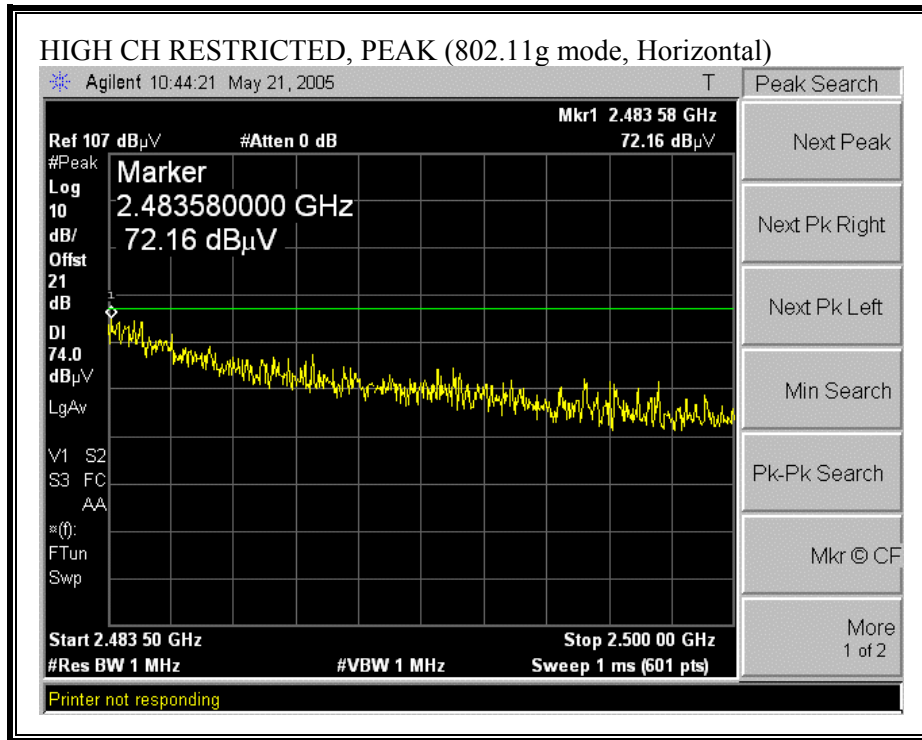


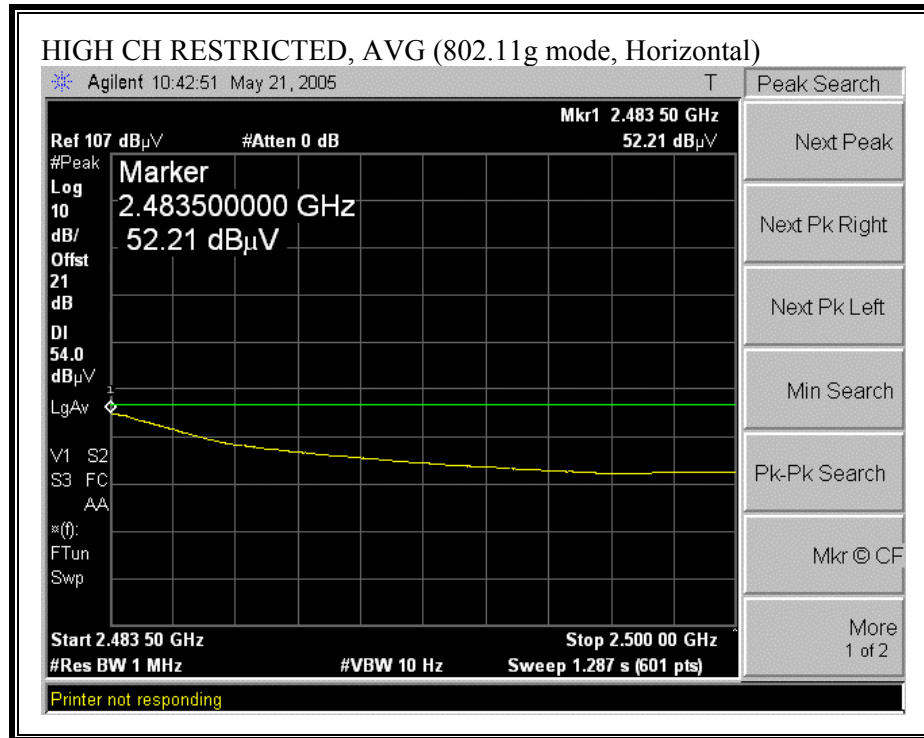
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



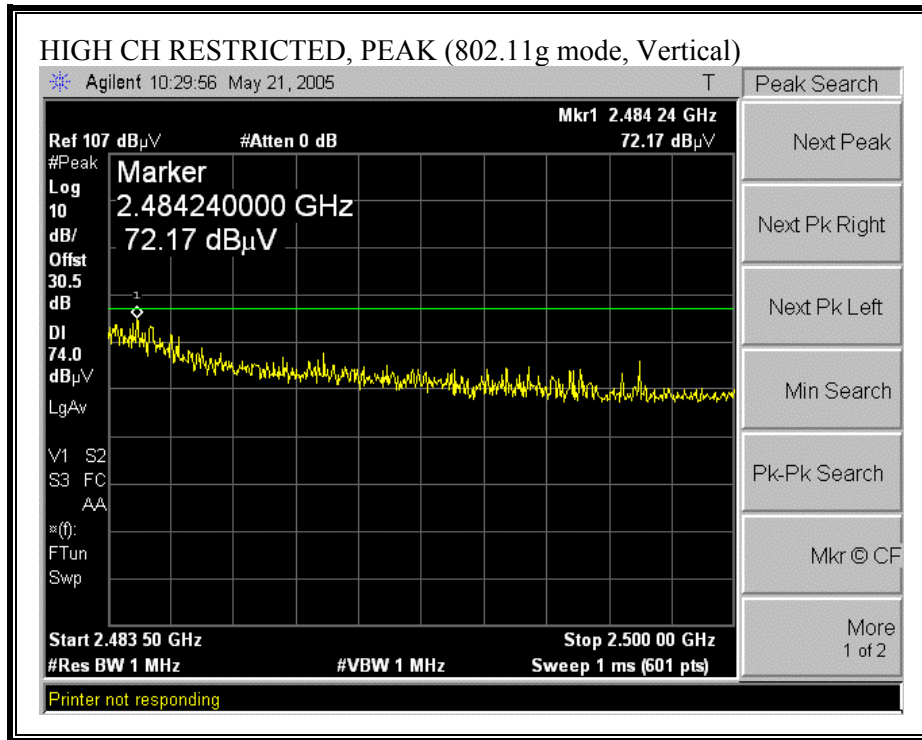


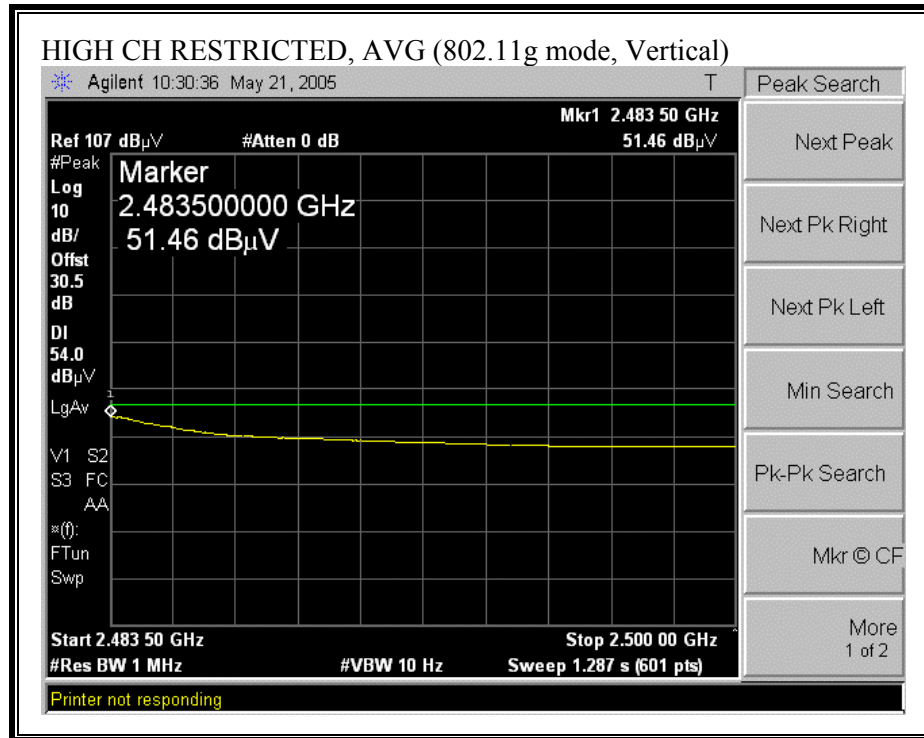
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (g MODE)

05/21/05
High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:Chin Pang
Project #:05U3391-1
Company:Toshiba
EUT Descrip.:802.11 a/b/g MB62HL Half-Size Mini-PCI WLAN Module with Antenna HTL017
EUT M/N:PA-3459U-1MPC
Test Target:FCC 15.247
Mode Oper:Tx, g mode

Test Equipment:

EMCO Horn 1-18GHz
T73; S/N: 6717 @3m

Pre-amplifier 1-26GHz
T87 Miteq 924342

Pre-amplifier 26-40GHz

Horn > 18GHz

Limit
FCC 15.205

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

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)
Low Ch															
4.824	3.0	52.7	38.6	33.7	4.1	-44.5	0.0	0.6	46.6	32.5	74	54	-27.4	-21.5	V
4.824	3.0	52.0	37.5	33.7	4.1	-44.5	0.0	0.6	45.9	31.4	74	54	-28.1	-22.6	H
mid ch															
4.874	3.0	51.5	38.0	33.8	4.1	-44.5	0.0	0.6	45.4	31.9	74	54	-28.6	-22.1	V
7.311	3.0	50.0	37.4	35.5	5.4	-43.6	0.0	0.6	47.9	35.3	74	54	-26.1	-18.7	V
4.874	3.0	50.0	37.4	33.8	4.1	-44.5	0.0	0.6	43.9	31.3	74	54	-30.1	-22.7	H
7.311	3.0	48.8	37.2	35.5	5.4	-43.6	0.0	0.6	46.7	35.1	74	54	-27.3	-18.9	H
High ch															
4.924	3.0	52.0	38.3	33.8	4.1	-44.6	0.0	0.6	46.0	32.3	74	54	-28.0	-21.7	V
7.386	3.0	50.5	37.6	35.6	5.4	-43.6	0.0	0.6	48.6	35.7	74	54	-25.4	-18.3	V
4.924	3.0	51.0	38.0	33.8	4.1	-44.6	0.0	0.6	45.0	32.0	74	54	-29.0	-22.0	H
7.386	3.0	50.0	37.5	35.6	5.4	-43.6	0.0	0.6	48.1	35.6	74	54	-25.9	-18.4	H
Note: No other emissions were detected above the system noise floor.															

f
Measurement Frequency

Dist
Distance to Antenna

Read
Analyzer Reading

AF
Antenna Factor

CL
Cable Loss

Amp
Preamp Gain

D Corr
Distance Correct to 3 meters

Avg
Average Field Strength @ 3 m

Peak
Calculated Peak Field Strength

HPF
High Pass Filter

Avg Lim
Average Field Strength Limit

Pk Lim
Peak Field Strength Limit

Avg Mar
Margin vs. Average Limit

Pk Mar
Margin vs. Peak Limit

7.2.3. TRANSMITTER ABOVE 1 GHz FOR 5725 TO 5850 MHz BAND

HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

05/21/05 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																
Test Engr:Chin Pang Project #:05U3391-1 Company:Toshiba EUT Descrip.:802.11 a/b/g MB62HL Half-Size Mini-PCI WLAN Module with Antenna HTL017 EUT M/N:PA-3459U-1MPC Test Target:FCC 15.247 Mode Oper:Tx, 5.8GHz Band																
Test Equipment:																
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit FCC 15.205								
Hi Frequency Cables										HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz		
2 foot cable		3 foot cable		4 foot cable		12 foot cable		HPF_7.6GHz		Reject Filter		Average Measurements RBW=1MHz ; VBW=10Hz				
4_Thanh		12_Neelash														
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)	
Low Ch																
11.490	3.0	48.0	36.0	38.3	7.1	-41.8	0.0	0.7	52.3	40.3	74	54	-21.7	-13.7	V	
11.490	3.0	47.5	35.4	38.3	7.1	-41.8	0.0	0.7	51.8	39.7	74	54	-22.2	-14.3	H	
mid ch																
11.570	3.0	48.5	36.3	38.3	7.2	-41.9	0.0	0.7	52.8	40.6	74	54	-21.2	-13.4	V	
11.570	3.0	48.0	36.0	38.3	7.2	-41.9	0.0	0.7	52.3	40.3	74	54	-21.7	-13.7	H	
High ch																
11.650	3.0	48.5	36.2	38.4	7.2	-42.0	0.0	0.7	52.8	40.5	74	54	-21.2	-13.5	V	
11.650	3.0	48.2	35.7	38.4	7.2	-42.0	0.0	0.7	52.5	40.0	74	54	-21.5	-14.0	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											

HORIZONTAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	99.840	19.38	11.38	30.76	43.50	-12.74	Peak
2	146.400	26.54	14.39	40.93	43.50	-2.57	Peak
3	227.880	22.96	12.95	35.91	46.00	-10.09	Peak
4	250.190	20.66	13.90	34.56	46.00	-11.44	Peak
5	327.790	19.55	16.35	35.90	46.00	-10.10	Peak
6	412.180	16.88	18.34	35.22	46.00	-10.78	Peak

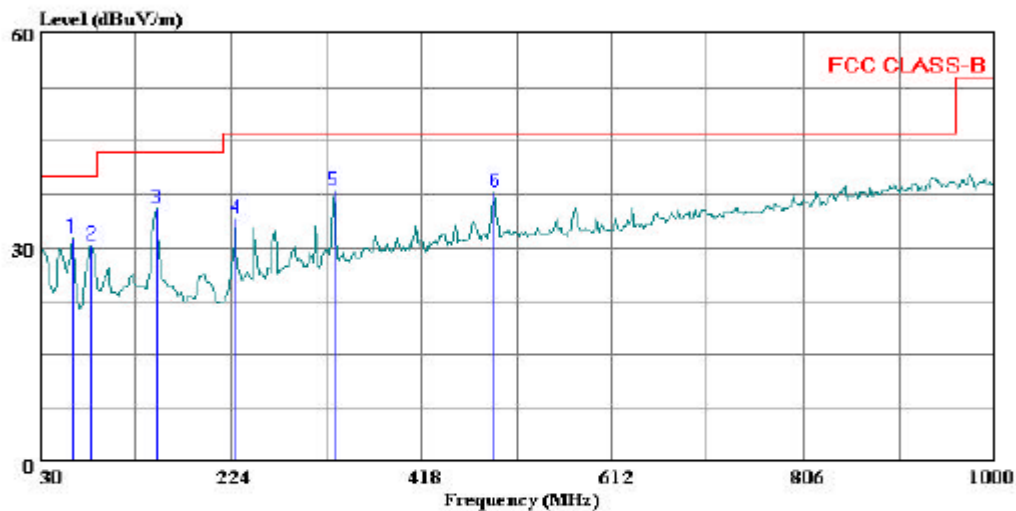
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL, B MODE)

VERTICAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: 3391 test.EMI Date: 05-20-2005 Time: 18:52:28



(Auxiliary ATC)

Trace: 3

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin Pang
Project #: : 05U3391-1
Company: : Toshiba
EUT: : 802.11 a/b/g MB62HL Half SizeMini-PCI
: WLAN with LAS Vegas Laptop (Antenna HTL017)
Model No. : TBD
Configuration : EUT and Las Vegas Laptop
Target of Test : FCC Class B
Mode of Operation: Tx (Mid Ch), b mode

VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	62.980	22.51	8.90	31.41	40.00	-8.59	Peak
2	82.380	21.73	8.60	30.33	40.00	-9.67	Peak
3	148.340	21.11	14.33	35.43	43.50	-8.07	Peak
4	227.880	21.12	12.95	34.07	46.00	-11.93	Peak
5	329.730	21.64	16.44	38.08	46.00	-7.92	Peak
6	492.690	17.58	20.11	37.69	46.00	-8.31	Peak

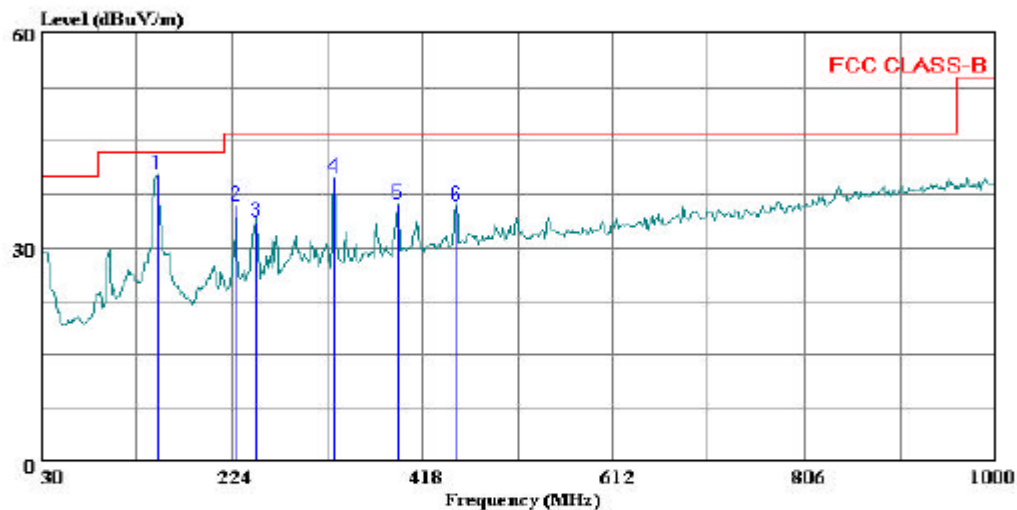
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL, G MODE)

HORIZONTAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: 3391 test.EMI Date: 05-20-2005 Time: 19:00:46



(Aux ATC)

Trace: 7

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL

Test Operator: : Chin Pang

Project #: : 05U3391-1

Company: : Toshiba

EUT: : 802.11 a/b/g MB62HL Half SizeMini-PCI

: WLAN with LAS Vegas Laptop (Antenna HTL017)

Model No. : TBD

Configuration : EUT and Las Vegas Laptop

Target of Test : FCC Class B

Mode of Operation: Tx (Mid Ch), g mode

HORIZONTAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	148.340	25.99	14.33	40.31	43.50	-3.19	Peak
2	227.880	23.05	12.95	36.00	46.00	-10.00	Peak
3	249.220	19.70	13.87	33.57	46.00	-12.43	Peak
4	327.790	23.49	16.35	39.84	46.00	-6.16	Peak
5	392.780	18.19	17.87	36.06	46.00	-9.94	Peak
6	452.920	16.68	19.26	35.94	46.00	-10.06	Peak

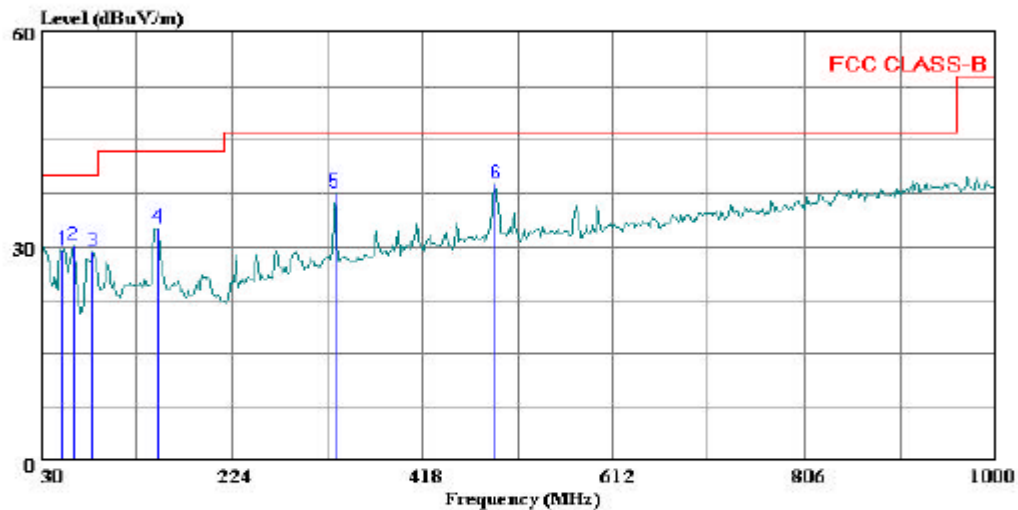
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL, G MODE)

VERTICAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 6 File#: 3391 test.EMI Date: 05-20-2005 Time: 18:56:36



(Auxiliary ATC)

Trace: 5

Ref Trace:

Condition: FCC CLASS-B VERTICAL

Test Operator: : Chin Pang

Project #: : 05U3391-1

Company: : Toshiba

EUT: : 802.11 a/b/g MB62HL Half Size Mini-PCI

: WLAN with LAS Vegas Laptop (Antenna HTL017)

Model No. : TBD

Configuration : EUT and Las Vegas Laptop

Target of Test : FCC Class B

Mode of Operation: Tx (Mid Ch), g mode

VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	52.310	20.46	8.94	29.40	40.00	-10.60	Peak
2	62.980	21.25	8.90	30.15	40.00	-9.85	Peak
3	82.380	20.62	8.60	29.22	40.00	-10.78	Peak
4	148.340	18.37	14.33	32.69	43.50	-10.81	Peak
5	329.730	21.06	16.44	37.50	46.00	-8.50	Peak
6	492.690	18.66	20.11	38.77	46.00	-7.23	Peak

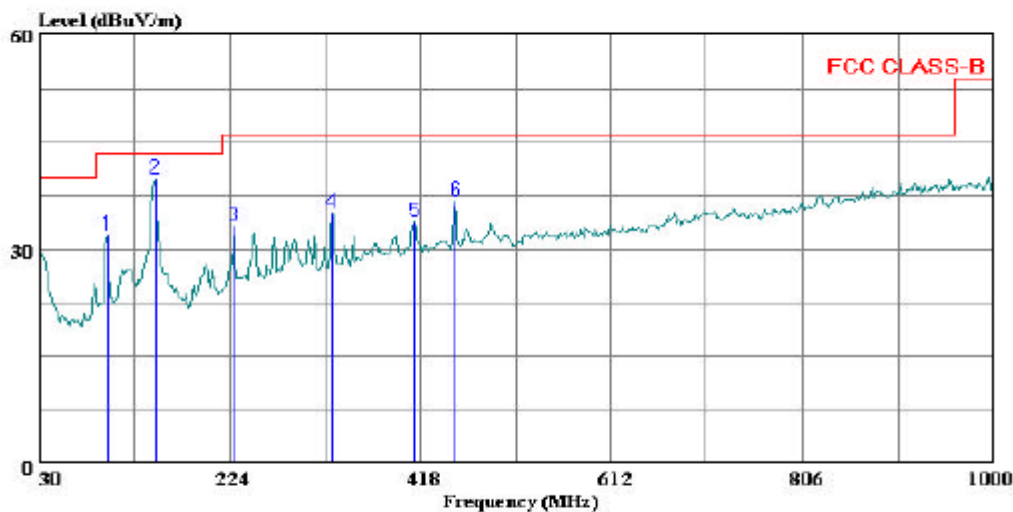
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL, A
MODE @5.8 GHZ BAND)**

HORIZONTAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 16 File#: 3391 test.EMI Date: 05-20-2005 Time: 19:18:47



(Auxiliary ATC)

Trace: 15

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL

Test Operator: : Chin Pang

Project #: : 05U3391-1

Company: : Toshiba

EUT: : 802.11 a/b/g MB62HL Half SizeMini-PCI

: WLAN with LAS Vegas Laptop (Antenna HTL017)

Model No. : TBD

Configuration : EUT and Las Vegas Laptop

Target of Test : FCC Class B

Mode of Operation: Tx (Mid Ch), 5.8GHz Band

HORIZONTAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	99.840	20.53	11.38	31.91	43.50	-11.59	Peak
2	148.340	25.52	14.33	39.84	43.50	-3.66	Peak
3	227.880	20.28	12.95	33.23	46.00	-12.77	Peak
4	327.790	18.85	16.35	35.20	46.00	-10.80	Peak
5	412.180	15.54	18.34	33.88	46.00	-12.12	Peak
6	453.890	17.43	19.28	36.71	46.00	-9.29	Peak

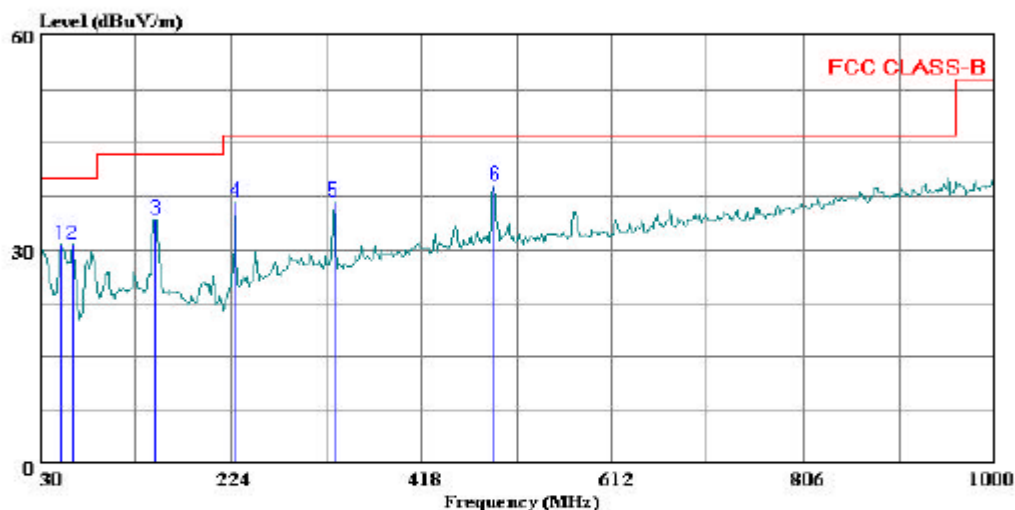
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL, A MODE @ 5.8 GHZ BAND)

VERTICAL PLOT



561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 14 File#: 3391 test.EMI Date: 05-20-2005 Time: 19:15:42



(Auxiliary ATC)

Trace: 13

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin Pang
Project #: : 05U3391-1
Company: : Toshiba
EUT: : 802.11 a/b/g MB62HL Half SizeMini-PCI
: WLAN with LAS Vegas Laptop (Antenna HTL017)
Model No. : TBD
Configuration : EUT and Las Vegas Laptop
Target of Test : FCC Class B
Mode of Operation: Tx (Mid Ch), 5.8GHz Band

VERTICAL DATA

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	51.340	21.62	9.05	30.67	40.00	-9.33	Peak
2	62.980	21.82	8.90	30.72	40.00	-9.28	Peak
3	147.370	19.89	14.39	34.28	43.50	-9.22	Peak
4	227.880	23.73	12.95	36.68	46.00	-9.32	Peak
5	329.730	20.32	16.44	36.76	46.00	-9.24	Peak
6	492.690	18.94	20.11	39.05	46.00	-6.95	Peak

7.3. POWERLINE CONDUCTED EMISSIONS

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 μ 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

B MODE:

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
0.22	48.64	--	--	0.00	62.71	52.71	-14.07	-4.07	L1
0.36	34.45	--	--	0.00	58.73	48.73	-24.28	-14.28	L1
6.73	34.00	--	--	0.00	60.00	50.00	-26.00	-16.00	L1
0.22	48.96	--	--	0.00	62.74	52.74	-13.78	-3.78	L2
0.35	35.66	--	--	0.00	59.06	49.06	-23.40	-13.40	L2
6.59	32.36	--	--	0.00	60.00	50.00	-27.64	-17.64	L2
6 Worst Data									

G MODE:

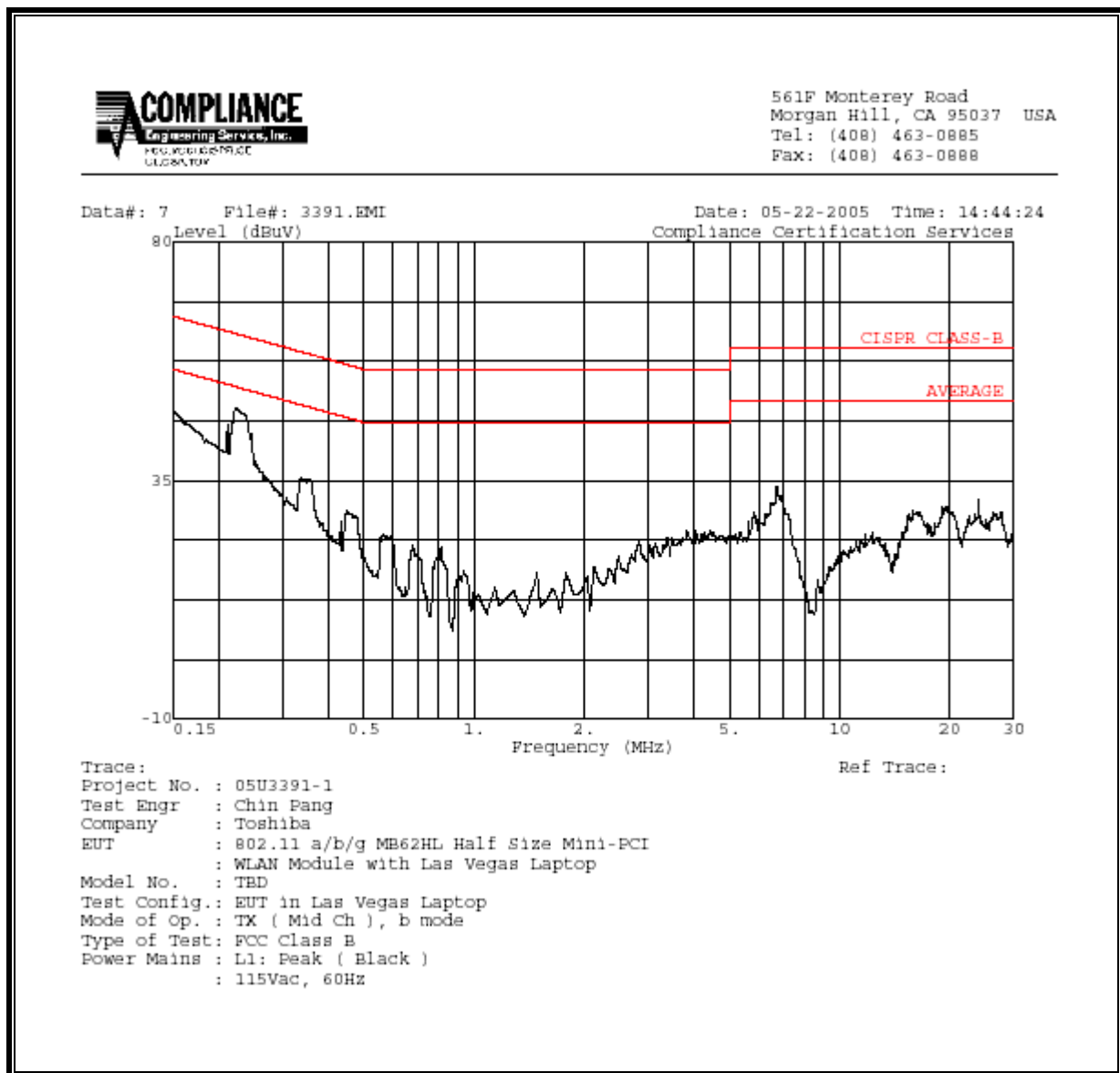
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	54.42	--	39.26	0.00	65.89	55.89	-11.47	-16.63	L1
0.32	34.54	--	21.21	0.00	59.71	49.71	-25.17	-28.50	L1
16.23	30.26	--	20.32	0.00	60.00	50.00	-29.74	-29.68	L1
0.16	53.97	--	39.36	0.00	65.67	55.67	-11.70	-16.31	L2
0.33	39.22	--	20.89	0.00	59.40	49.40	-20.18	-28.51	L2
16.05	30.62	--	20.59	0.00	60.00	50.00	-29.38	-29.41	L2
6 Worst Data									

A MODE @ 5.8 GHZ BAND

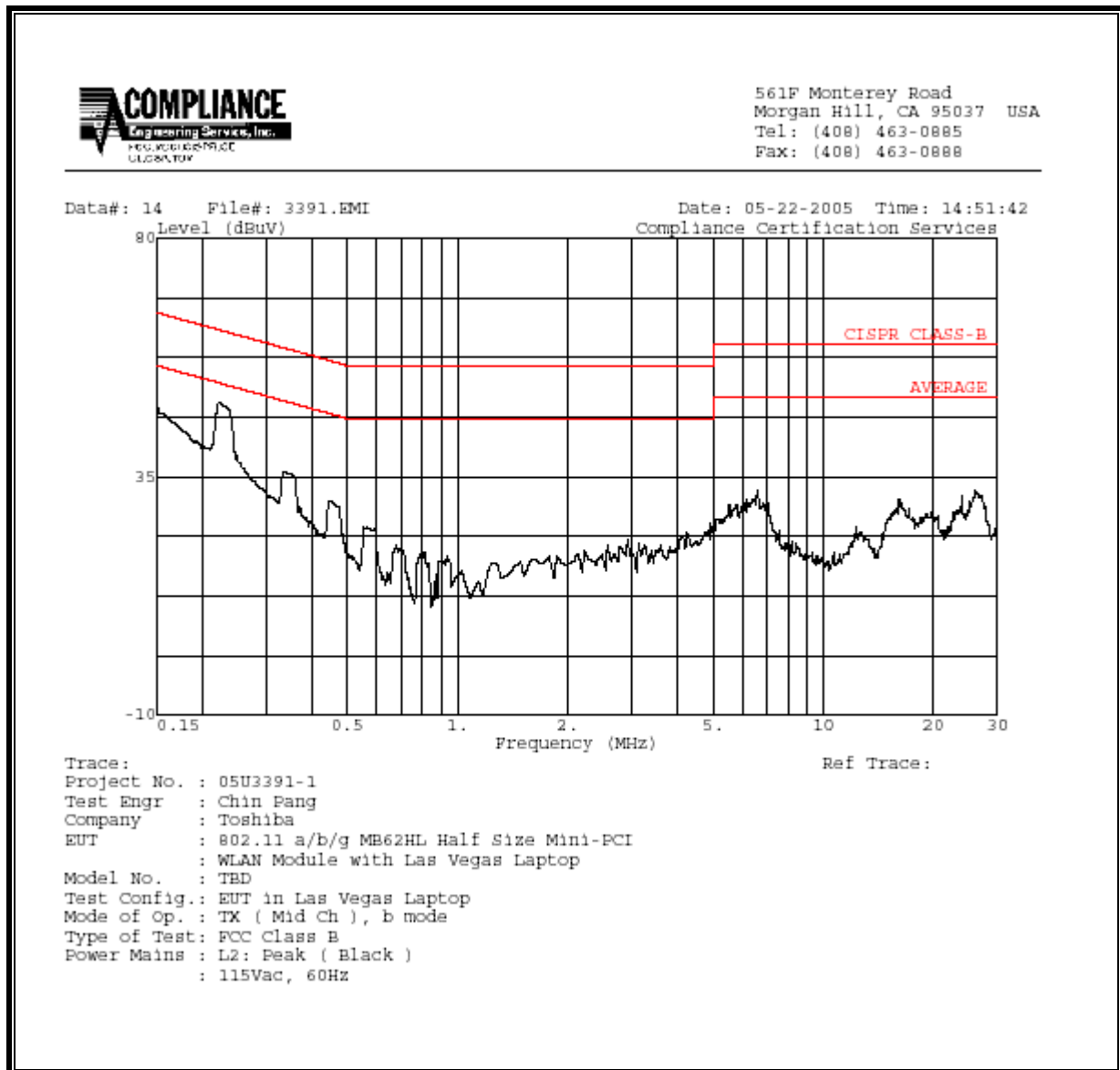
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	49.36	--	--	0.00	65.89	55.89	-16.53	-6.53	L1
0.27	42.23	--	--	0.00	61.03	51.03	-18.80	-8.80	L1
6.81	30.06	--	--	0.00	60.00	50.00	-29.94	-19.94	L1
0.15	56.54	41.14	--	0.00	65.89	55.89	-24.75	-14.75	L2
0.31	41.10	24.93	--	0.00	60.11	50.11	-35.18	-25.18	L2
5.71	29.69	15.26	--	0.00	60.00	50.00	-44.74	-34.74	L2
6 Worst Data									

B MODE:

LINE 1 RESULTS

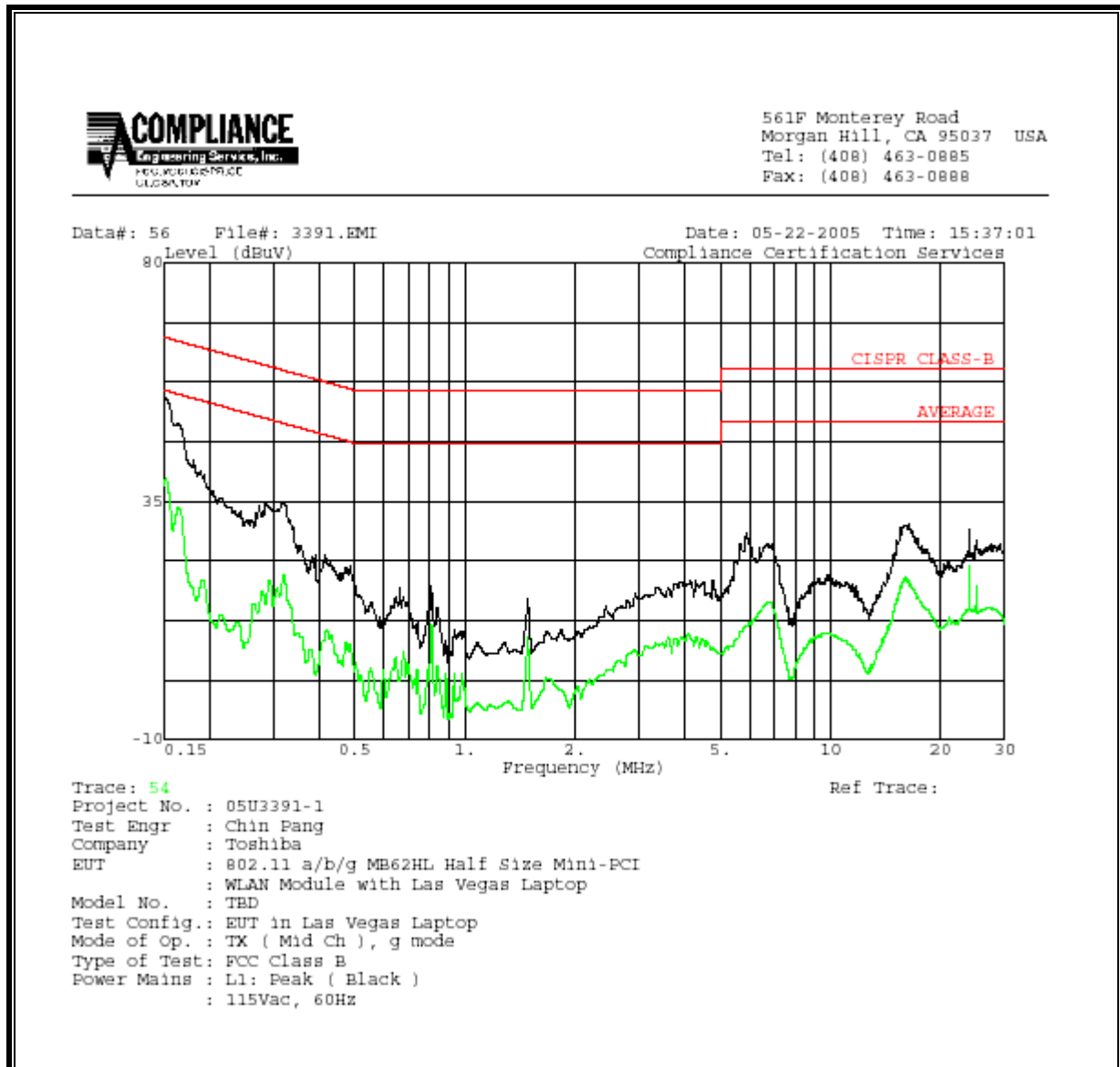


LINE 2 RESULTS

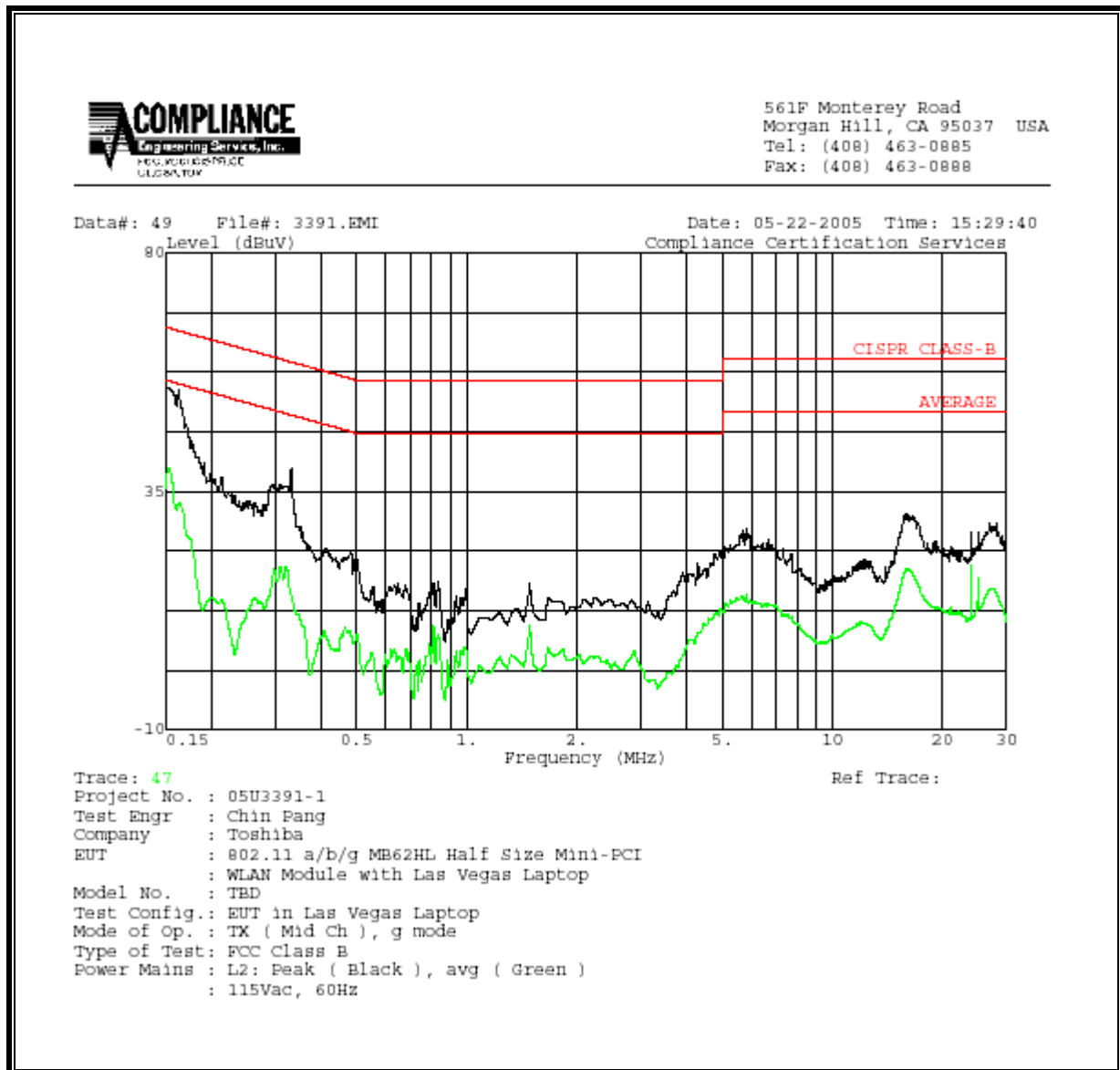


G MODE:

LINE 1 RESULTS



LINE 2 RESULTS



A MODE @ 5.8 GHZ BAND:

LINE 1 RESULTS

