FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 7

CLASS II PERMISSIVE CHANGE
CERTIFICATION TEST REPORT

FOR

WIRELESS 3945ABG NETWORK CONNECTION

MODEL NUMBER: PA3489U-1MPC

FCC ID: CJ6UPA3489WL

IC: 248H-DPA3489W

REPORT NUMBER: 07U11380-2, REVISION C

ISSUE DATE: NOVEMBER 28, 2007

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

Prepared by
COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/24/07	Initial Issue	T. Chan
B	10/31/07	Corrected model number	T. Hong
C	11/28/07	Added results to provide L/M/H channels in both 5.15-5.25 and 5.25-5.35 MHz bands	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: WIRELESS 3945ABG NETWORK CONNECTION

MODEL: PA3489U-1MPC

SERIAL NUMBER: RC4731509405

DATE TESTED: OCTOBER 18-19, 2007

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	No Non-Compliance Noted
RSS-210 Issue 7 Annex 9 and RSS-GEN Issue 2	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:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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 802.11abg transceiver in Toshiba Protégé M400 Tablet.

The radio module is manufactured by Intel Corporation.

5.2. CLASS II PERMISSIVE CHANGE DESCRIPTION

The major change filed under this application is:

The EUT module is being used in a Toshiba Protégé M700 Tablet.

5.3. MAXIMUM OUTPUT POWER

The transmitter has the same maximum conducted output power from the original grant.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two PIFA antennas for diversity, each with a maximum gain of –1.06 dBi @ 5.2 GHz

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was Intel PRO/Wireless 4965AG Network Connection xVT, version 11.1.0.53.

5.6. WORST-CASE CONFIGURATION AND MODE

The portable X, Y and Z positions have been investigated, Z Position was determined as the worst-case position for 2.4GHz band and Y position for the 5GHz band.

The worst-case channel is determined by the channel with the highest output power. The worst data bit rate of 5GHz band for 802.11a mode @ 6Mb/s.

The worst-case channel tests were performed only at 802.11a mode bandedge and high channel for harmonic, and also Rx and below 1GHz for worst-case testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Toshiba	Wengen10-CS	WGN10-CS-105	DoC
AC Adapter	Toshiba	PA3283U-5ACA	G71C00006Q210	DoC

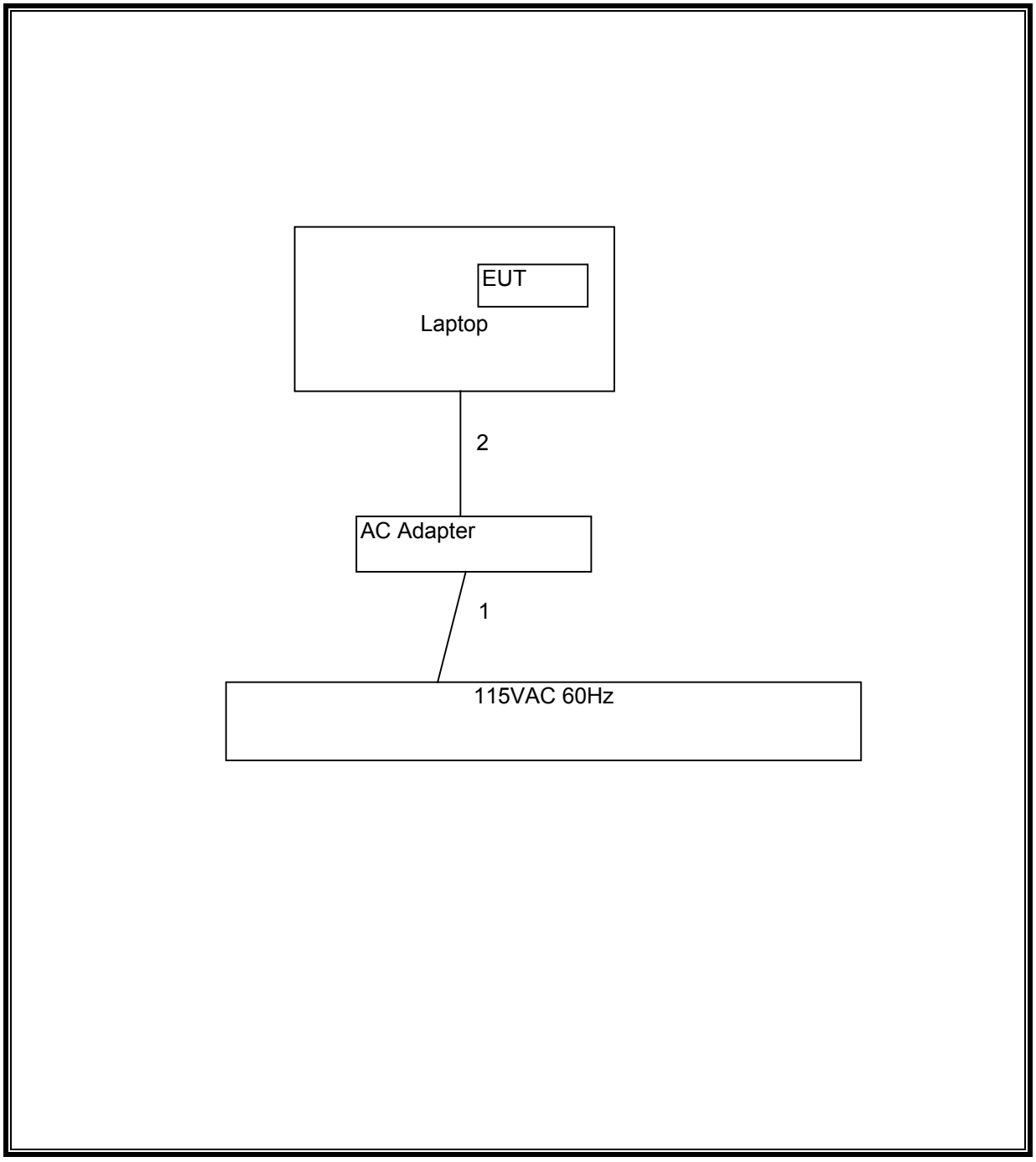
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	2m	NA

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**
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	8/7/2008
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	9/28/2008
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A0022704	9/29/2008
Preamp 30-1000MHz	Sonoma	310N	185623	1/20/2008
EMI Receiver, 9 kHz ~ 2.9 GHz	Agilent / HP	8542E	3942A00286	6/12/2008
RF Filter Section	Agilent / HP	85420E	3705A00256	6/12/2008
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/15/2008
EMI Test Receiver	R & S	ESHS 20	827129/006	1/27/2008
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	12/15/2007

7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

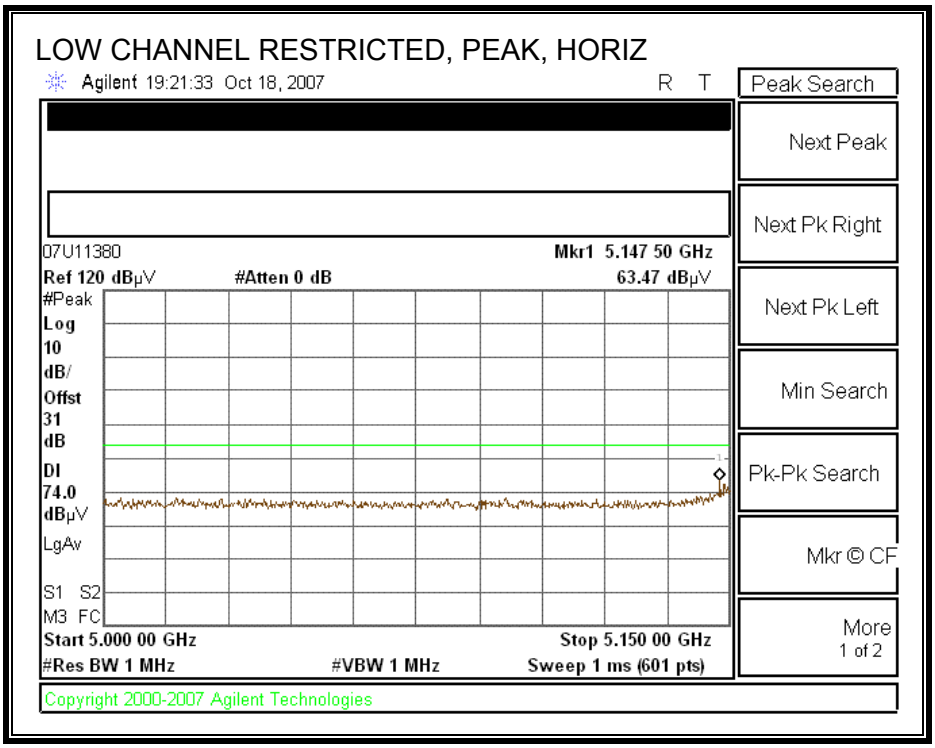
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

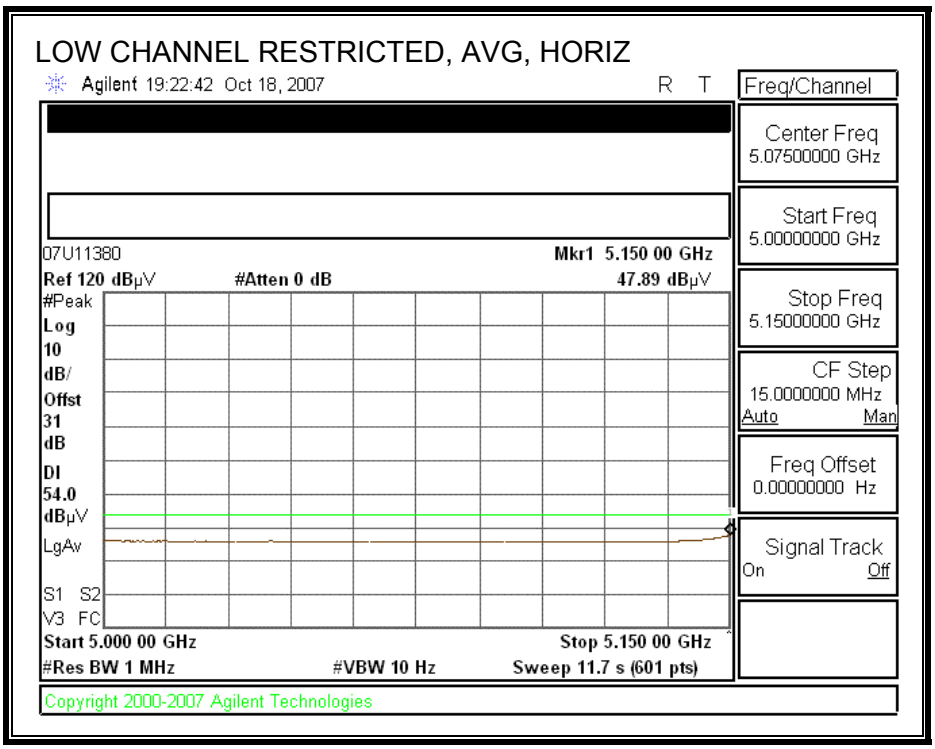
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The 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.

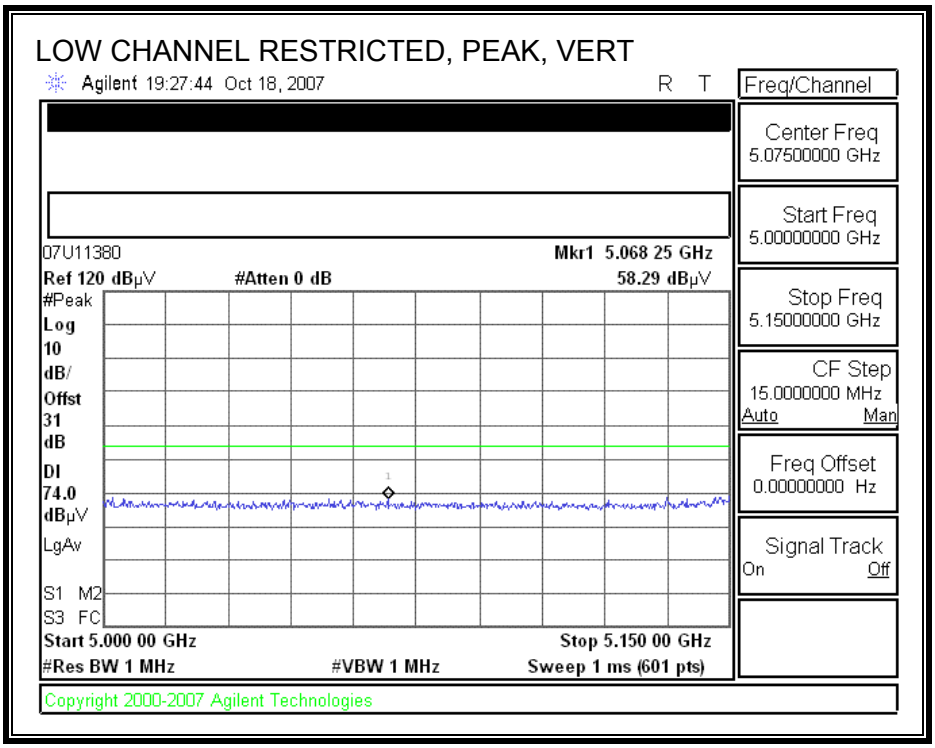
7.1.1. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.2 GHz BAND

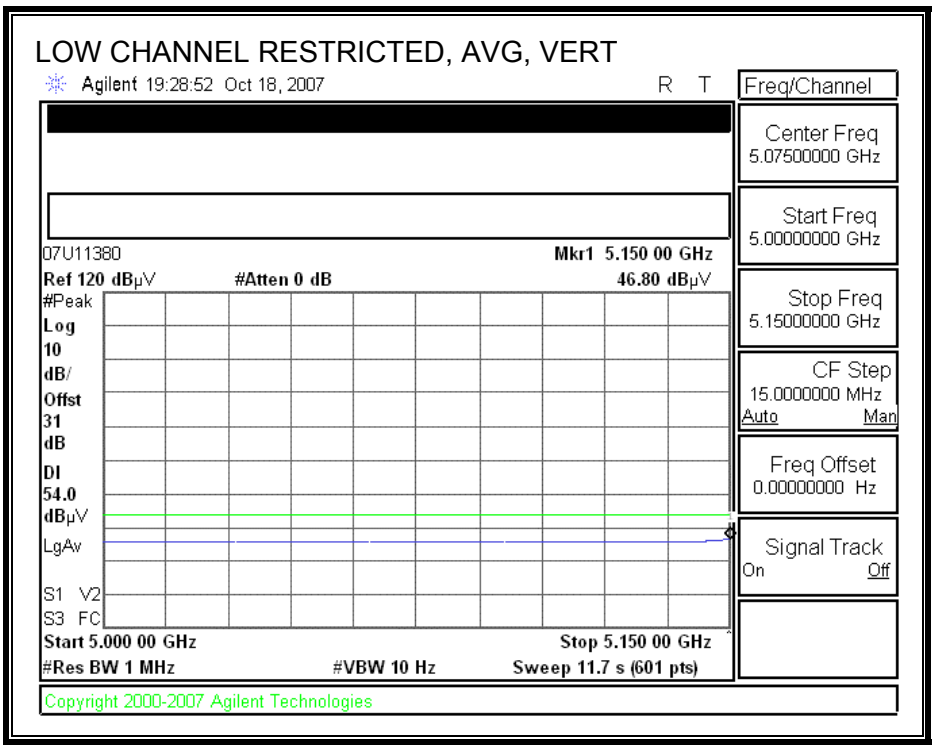
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



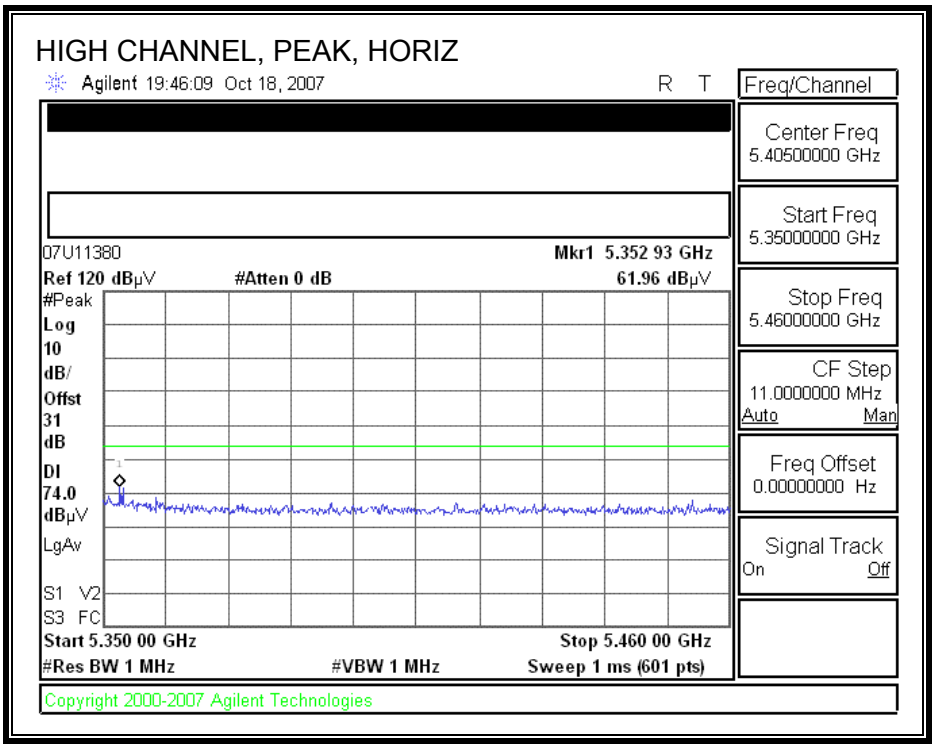


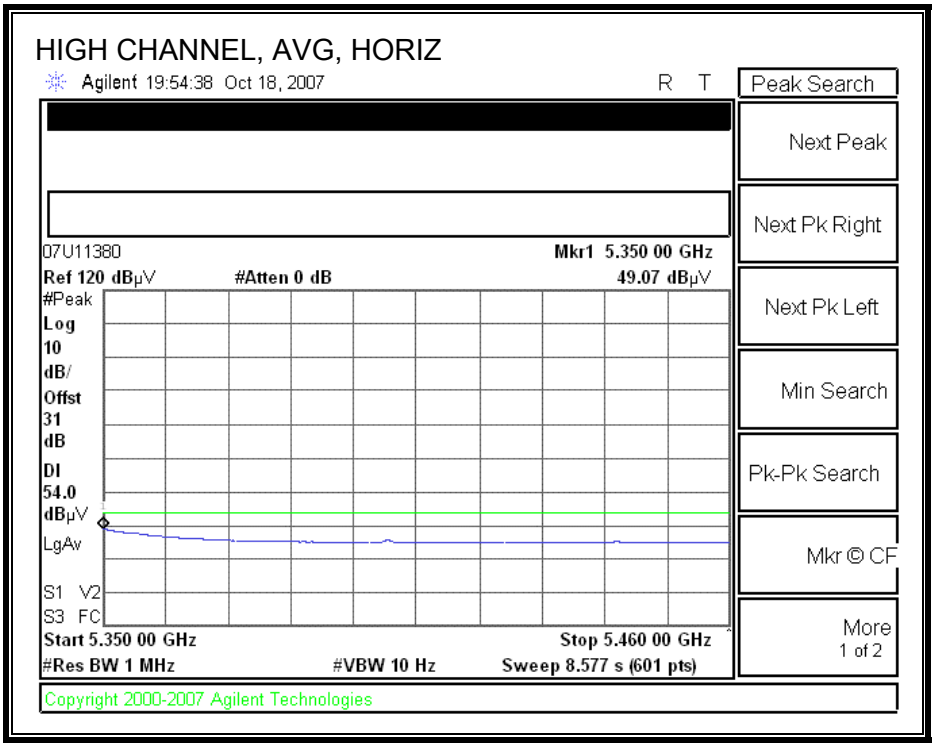
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



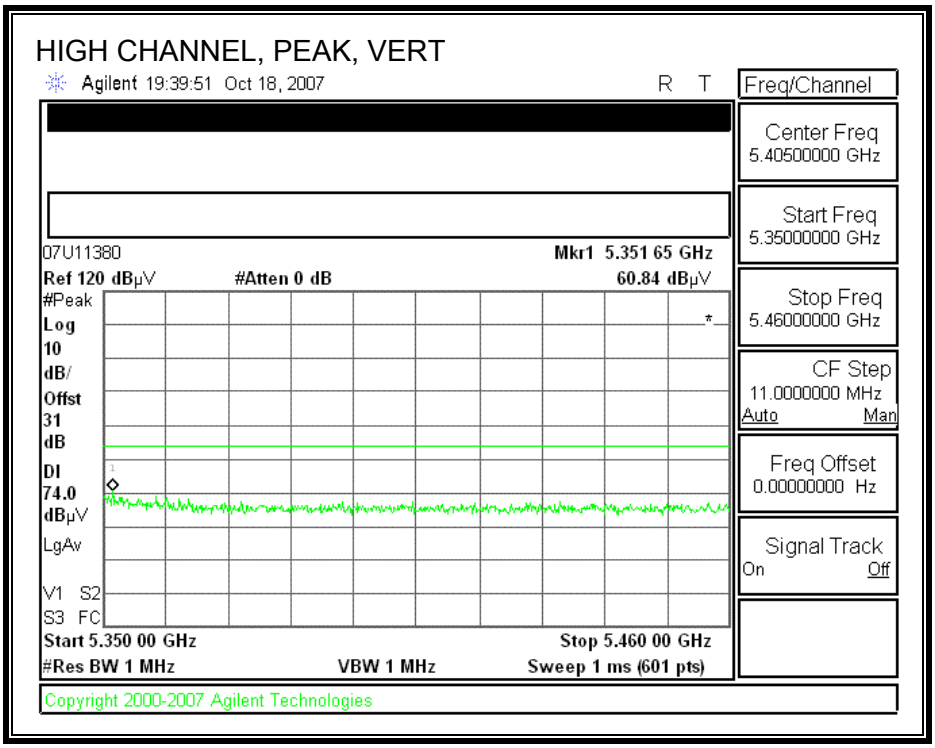


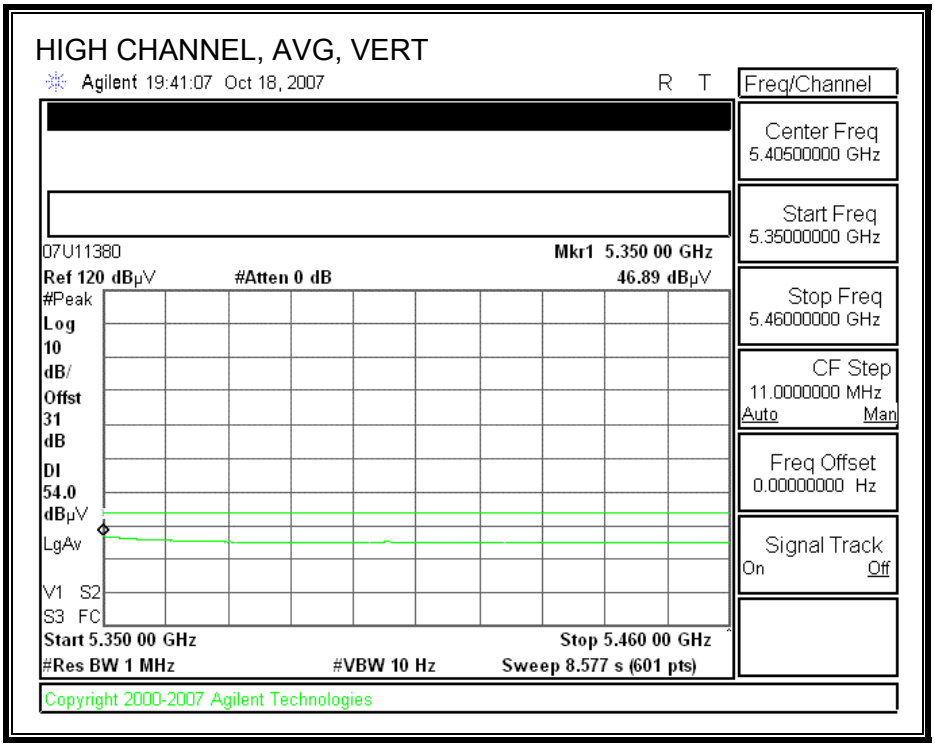
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Toshiba
Project #: 07U11380
Date: 10/18/07
Test Engineer: Can Ming Chung
Configuration: EUT IN HOST LAPTOP
Mode: TX a -MODE (worst Case Position)

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931	T88 Miteq 26-40GHz	T89; ARA 18-26GHz; S/N:1049	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A-5m Chamber	HPF_7.6GHz	

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	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															
15.540	3.0	41.5	29.5	38.1	12.7	-34.8	0.0	0.7	58.1	46.1	74	54	-15.9	-7.9	H
15.540	3.0	40.6	29.6	38.1	12.7	-34.8	0.0	0.7	57.2	46.2	74	54	-16.8	-7.8	V
Mid Ch															
15.780	3.0	42.0	29.7	37.5	12.8	-34.6	0.0	0.7	58.4	46.1	74	54	-15.6	-7.9	H
15.780	3.0	41.1	29.4	37.5	12.8	-34.6	0.0	0.7	57.5	45.8	74	54	-16.5	-8.2	V
High Ch															
10.640	3.0	42.8	33.7	37.1	10.7	-36.6	0.0	0.8	54.8	45.7	74	54	-19.2	-8.3	H
15.960	3.0	42.5	30.5	37.1	12.8	-34.5	0.0	0.7	58.6	46.6	74	54	-15.4	-7.4	H
10.640	3.0	41.5	32.0	37.1	10.7	-36.6	0.0	0.8	53.5	44.0	74	54	-20.5	-10.0	V
15.960	3.0	42.0	30.3	37.1	12.8	-34.5	0.0	0.7	58.1	46.4	74	54	-15.9	-7.6	V

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: Toshiba
Project #: 07U11380
Date: 11/20/2007
Test Engineer: Chin Pang
Configuration: EUT only
Mode: TX, a mode, Legacy

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T119; S/N: 29301 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	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
	Chin 197538001	Gordon 203134001	HPF_7.6GHz	

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	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)
5200MHz															
15.600	3.0	49.3	35.6	38.7	5.6	-32.2	0.0	0.7	62.2	48.5	74	54	-11.8	-5.5	V
15.600	3.0	49.0	35.5	38.7	5.6	-32.2	0.0	0.7	61.9	48.4	74	54	-12.1	-5.6	H
5240MHz															
15.720	3.0	51.2	37.2	38.8	5.6	-32.2	0.0	0.7	64.2	50.2	74	54	-9.8	-3.8	V
15.720	3.0	49.8	35.8	38.8	5.6	-32.2	0.0	0.7	62.8	48.8	74	54	-11.2	-5.2	H
5300MHz															
10.600	3.0	52.6	38.0	36.8	4.1	-32.6	0.0	0.8	61.7	47.1	74	54	-12.3	-6.9	V
15.900	3.0	52.0	37.8	38.8	5.7	-32.1	0.0	0.7	65.1	50.9	74	54	-8.9	-3.1	V
10.600	3.0	50.0	36.4	36.8	4.1	-32.6	0.0	0.8	59.1	45.5	74	54	-14.9	-8.5	H
15.900	3.0	51.0	36.8	38.8	5.7	-32.1	0.0	0.7	64.1	49.9	74	54	-9.9	-4.1	H

Rev. 5.1.6
Note: No other emissions were detected above the systm 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		

7.1.2. RECEIVER ABOVE 1 GHz IN THE 5.2 GHz BAND

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Toshiba
Project #: 07U11378
Date: 10/19/2007
Test Engineer: Chin Pang
Configuration: EUT/Laptop
Mode: RX, 5.2GHz (Worst Case)

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

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)
Mid Ch															
1.330	3.0	60.6	43.8	25.0	3.4	-39.0	0.0	0.0	50.0	33.2	74	54	-24.0	-20.8	V
1.600	3.0	54.5	40.0	26.0	3.8	-38.6	0.0	0.0	45.6	31.1	74	54	-28.4	-22.9	V
1.660	3.0	56.0	41.0	26.2	3.9	-38.5	0.0	0.0	47.5	32.5	74	54	-26.5	-21.5	V
1.331	3.0	58.0	44.2	25.0	3.4	-39.0	0.0	0.0	47.4	33.6	74	54	-26.6	-20.4	H
1.598	3.0	56.6	40.4	26.0	3.8	-38.6	0.0	0.0	47.7	31.5	74	54	-26.3	-22.5	H
1.660	3.0	57.2	41.8	26.2	3.9	-38.5	0.0	0.0	48.7	33.3	74	54	-25.3	-20.7	H

Rev. 4.12.7
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		

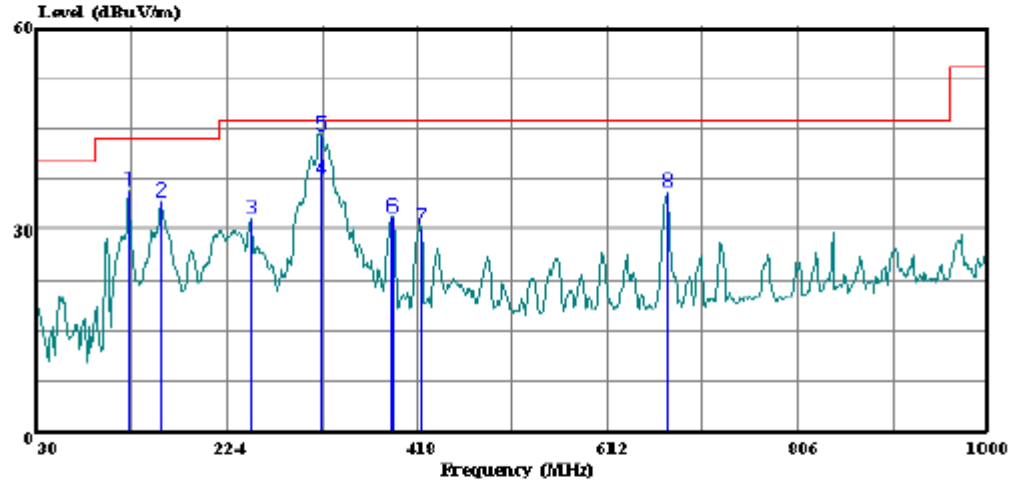
7.2. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT

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

Data#: 6 File#: 07U11380 emi.EMI Date: 10-19-2007 Time: 11:11:05



Trace: 3 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Chin Pang
Project #: : 07U11380
Company: : Toshiba
Model: : PA3489U-1MPC
Description: : Wireless 3945ABG Network Connection
Configuration:: EUT / Laptop
Mode : : TX (Worst Case)
Target: : FCC Class B

HORIZONTAL DATA

Page: 1

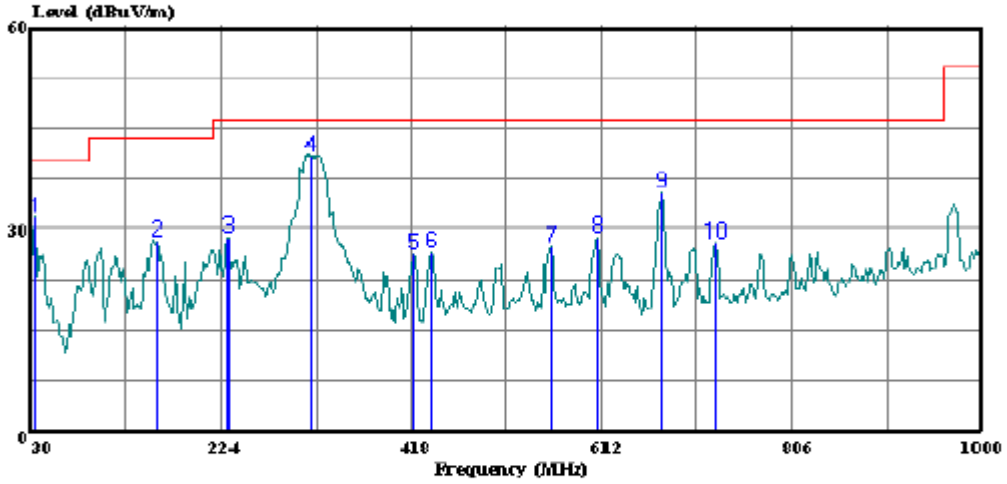
	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	124.090	52.10	35.58	-16.52	43.50	-7.92	Peak
2	155.130	51.73	34.11	-17.63	43.50	-9.40	Peak
3	247.280	49.37	31.43	-17.94	46.00	-14.57	Peak
4	319.060	52.70	37.37	-15.33	46.00	-8.63	QP
5	319.060	59.28	43.95	-15.33	46.00	-2.05	Peak
6	392.780	45.22	31.66	-13.56	46.00	-14.34	Peak
7	421.880	43.07	30.20	-12.87	46.00	-15.80	Peak
8	672.140	44.17	35.21	-8.96	46.00	-10.79	Peak

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

VERTICAL PLOT

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

Data#: 2 File#: 07U11380 emi.EMI Date: 10-19-2007 Time: 10:39:41



Trace: 1 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Chin Pang
Project #: : 07U11380
Company: : Toshiba
Model: : PA3489U-1MPC
Description: : Wireless 3945ABG Network Connection
Configuration:: EUT / Laptop
Mode : : TX (Worst Case)
Target: : FCC Class B

VERTICAL DATA

Page: 1

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV/m	dB	dBuV/m	dB	
1	33.880	43.09	31.68	-11.41	40.00	-8.32	Peak
2	158.040	46.01	28.40	-17.61	43.50	-15.10	Peak
3	230.790	47.17	28.77	-18.40	46.00	-17.23	Peak
4	315.180	56.03	40.76	-15.27	46.00	-5.24	Peak
5	419.940	39.48	26.50	-12.98	46.00	-19.50	Peak
6	439.340	39.38	26.88	-12.50	46.00	-19.12	Peak
7	560.590	37.86	27.47	-10.39	46.00	-18.53	Peak
8	609.090	38.56	28.81	-9.75	46.00	-17.19	Peak
9	674.080	44.28	35.40	-8.88	46.00	-10.60	Peak
10	727.430	36.07	28.08	-8.00	46.00	-17.93	Peak