



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

**CLASS II PERMISSIVE CHANGE  
CERTIFICATION TEST REPORT**

**FOR**

**WIRELESS WIFI LINK 4965AG**

**MODEL NUMBER: PA3539U-1MPC**

**FCC ID: CJ6UPA3539WL**

**IC: 248H-DPA3539W**

**REPORT NUMBER: 07U11379-2, Revision B**

**ISSUE DATE: NOVEMBER 28, 2007**

*Prepared for*  
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/01/07	Initial Issue based on CCS Report 07U11378-2, dated October 24, 2007.	T. Chan
B	11/28/07	Revision based on CCS Report 07U11378-2B, dated November 28, 2007 Added results to provide L/M/H channels in both 5.15-5.25 and 5.25-5.35 MHz bands	T. Chan

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## 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 WIFI LINK 4965AG

**MODEL:** PA3539U-1MPC

**SERIAL NUMBER:** GC2710504832

**DATE TESTED:** OCTOBER 12-16, 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:



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THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



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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, 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 802.11a/b/g/n transceiver in Toshiba Protégé R400 Tablet.

The radio module is manufactured by Intel Corporation

### 5.2. STATEMENT OF MODEL DIFFERENCES

Model PA3539U-1MPC is identical to the model tested (PA3538U-1MPC) except that MIMO has been disabled.

### 5.3. 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.

### 5.4. MAXIMUM OUTPUT POWER

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

### 5.5. DESCRIPTION OF AVAILABLE ANTENNAS

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

### 5.6. SOFTWARE AND FIRMWARE

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

The test utility software used during testing was CRTU, rev. 4.1.20.0000

## 5.7. WORST-CASE CONFIGURATION AND MODE

The portable X, Y and Z positions have been investigated, and the Y position was determined to be the worst case 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 @ 6Mb/s, 802.11n 20MHz BW @ HT0 and HT8, 802.11n 40MHz BW @ HT0 and HT8.

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba	Protégé M700	970125BJ	DoC
AC Adapter	Toshiba	PA3283U-5ACA	G71C0006Q210	DoC

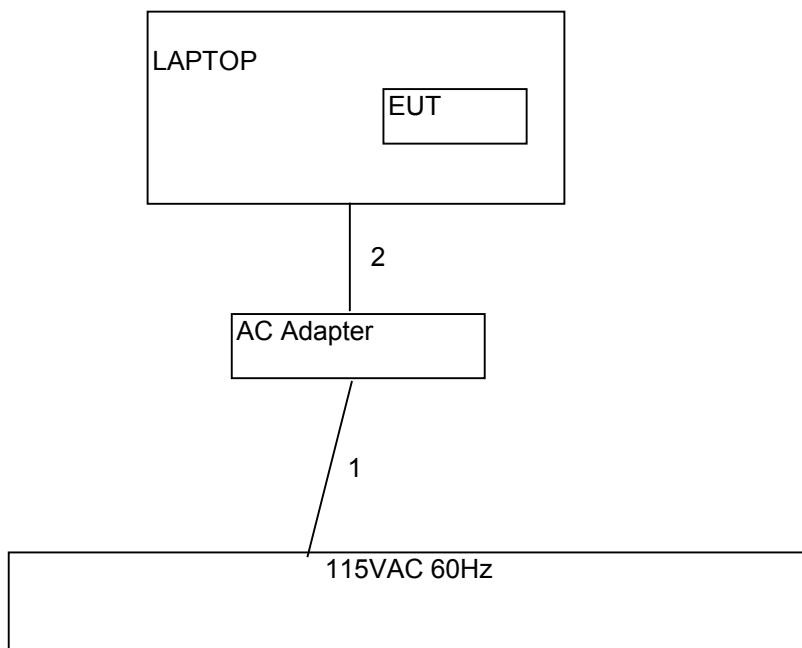
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical 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 inside 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
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2/15/1906	4/15/2008
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	8/29/2008
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A0022704	9/28/008
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	9/28/2008
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY45300064	3/18/2008
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
Antenna, Horn 18 ~ 26 GHz	ARA	MWH-1826/B	1049	9/29/2008
Preamplifier, 26 ~ 40 GHz	Miteq	NSP4000-SP2	924343	11/24/2007

## 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.

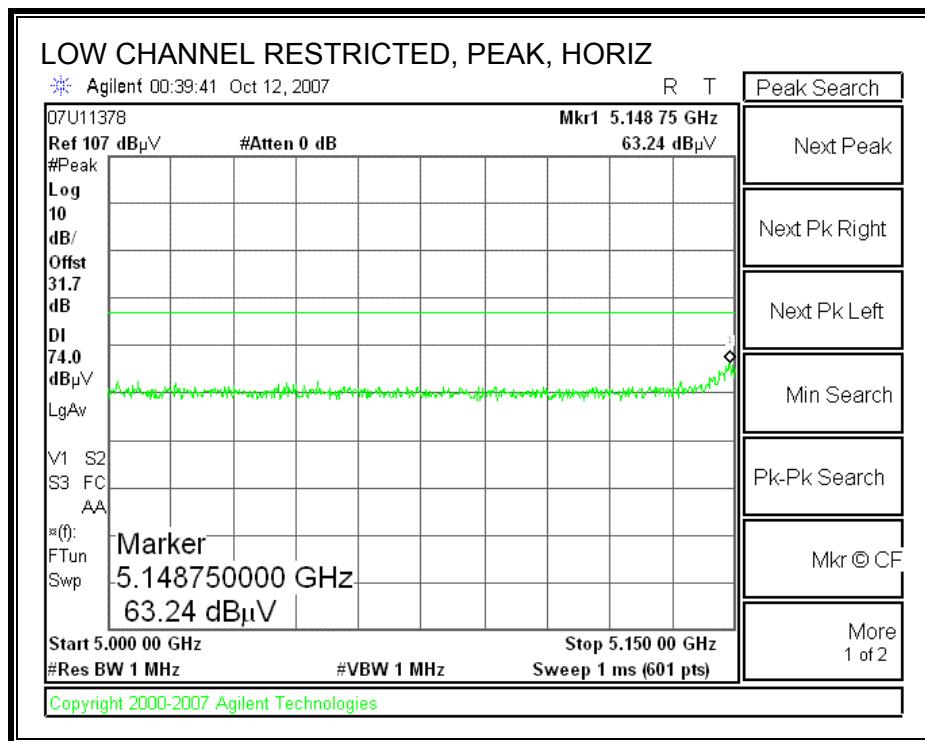
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

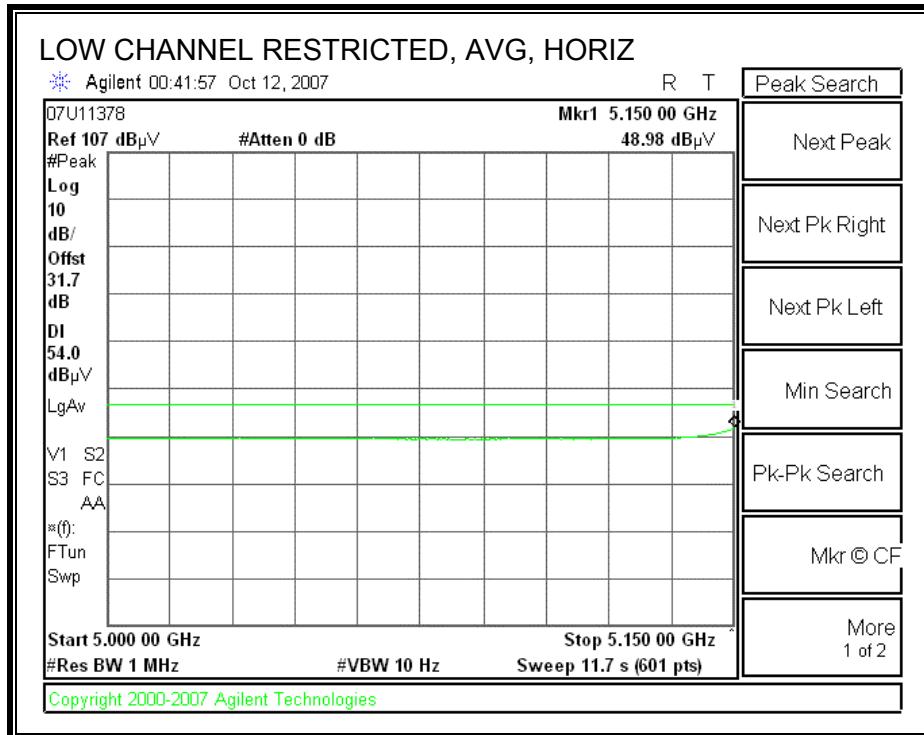
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

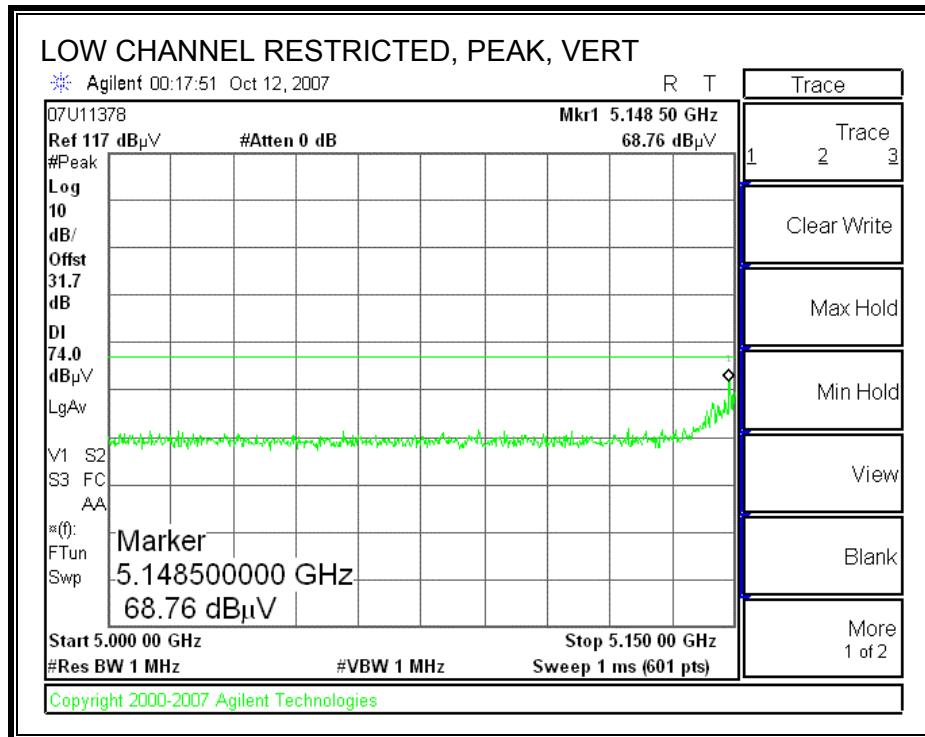
### 7.1.1. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.2 GHz BAND

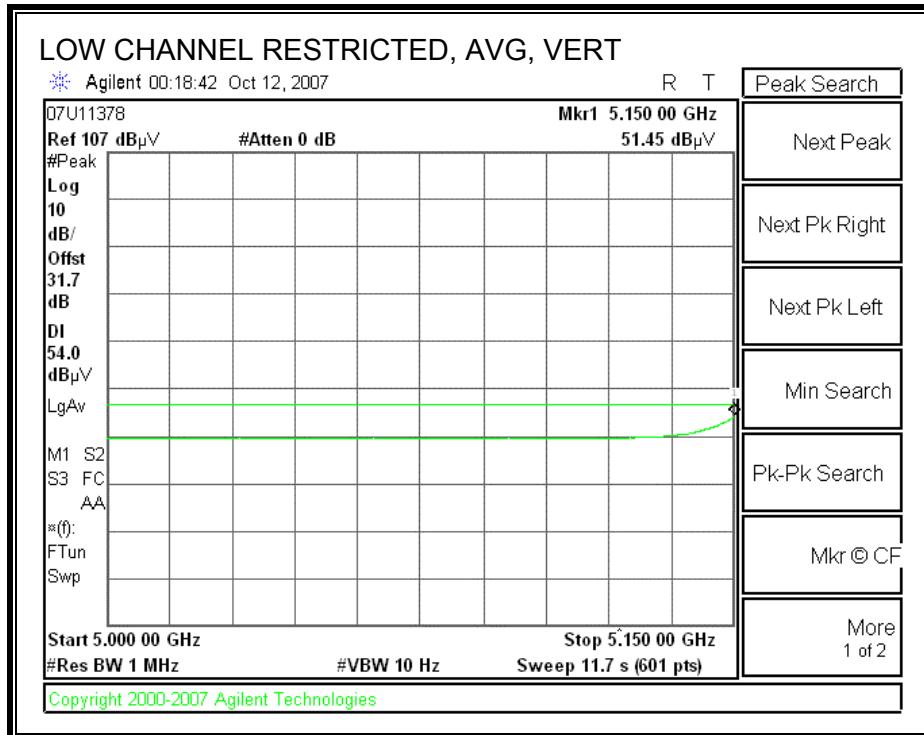
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



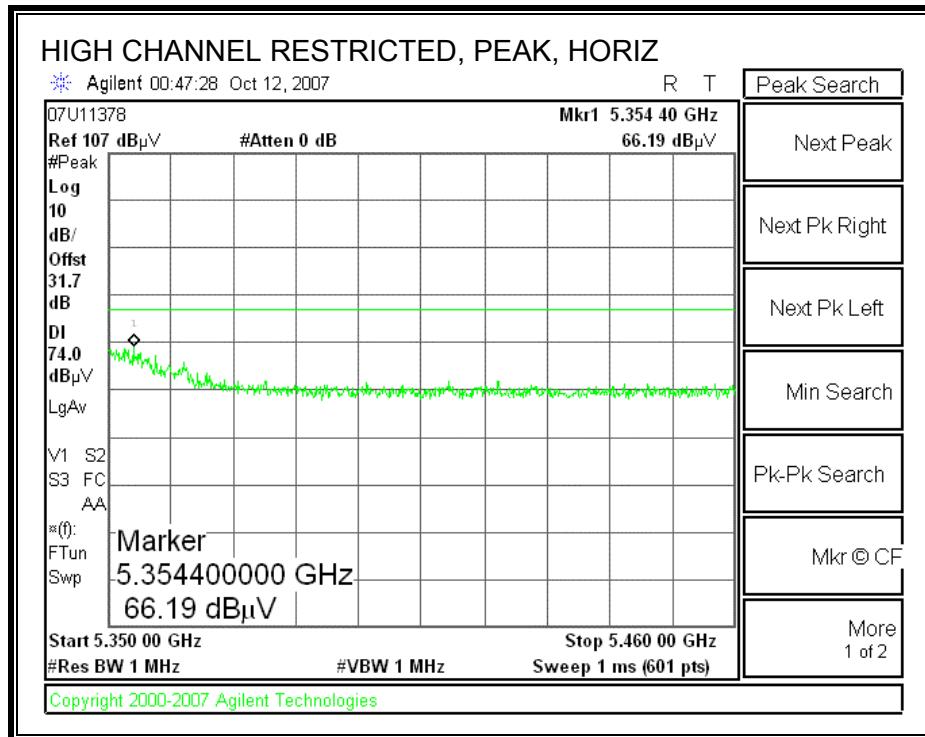


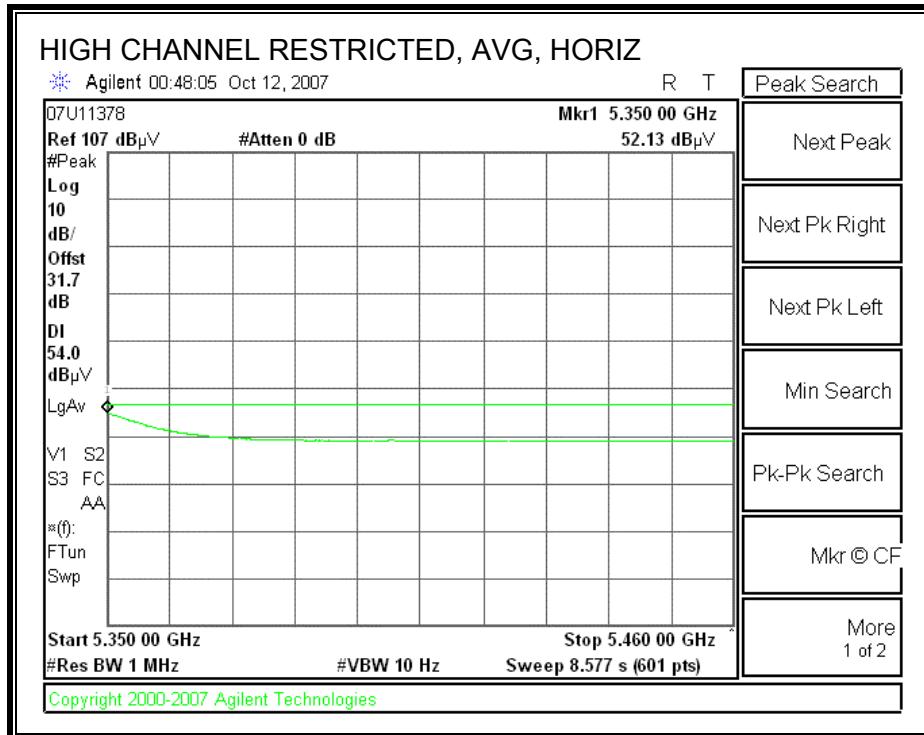
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



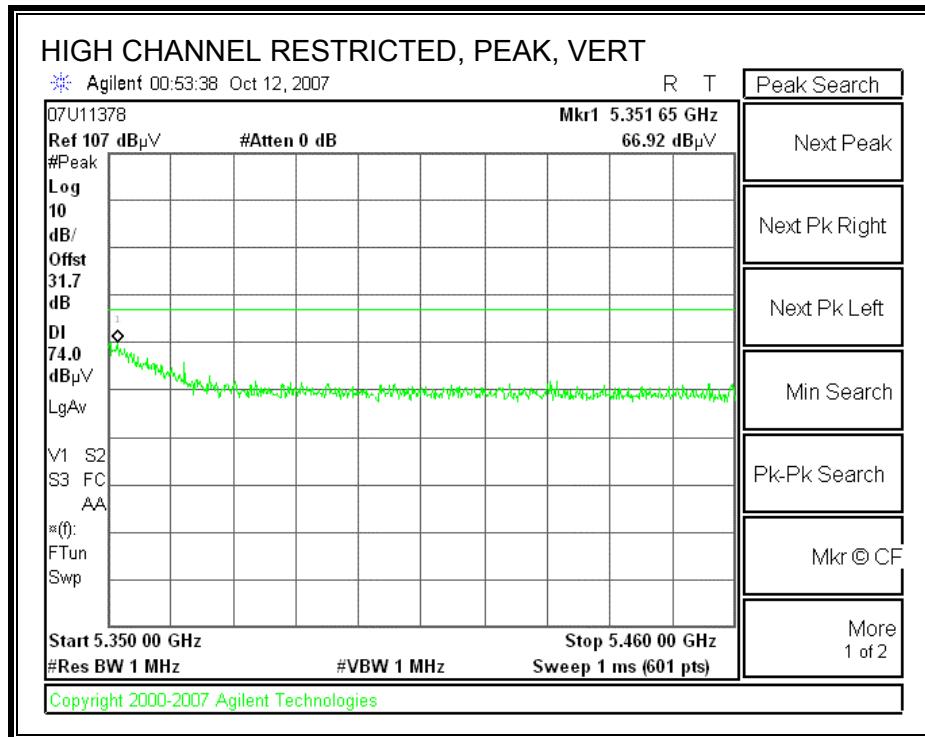


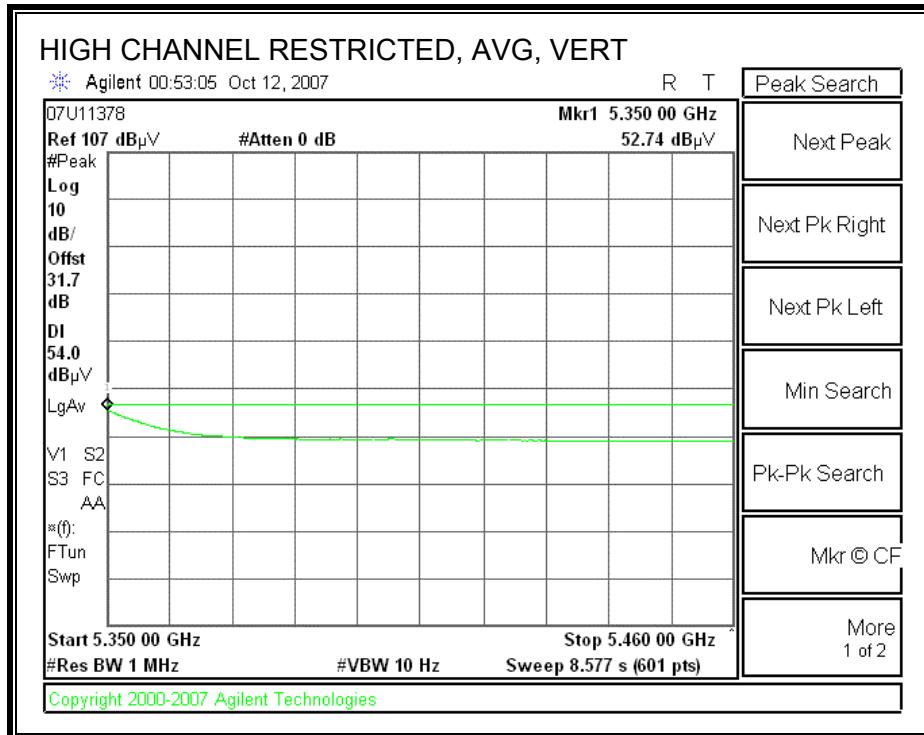
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





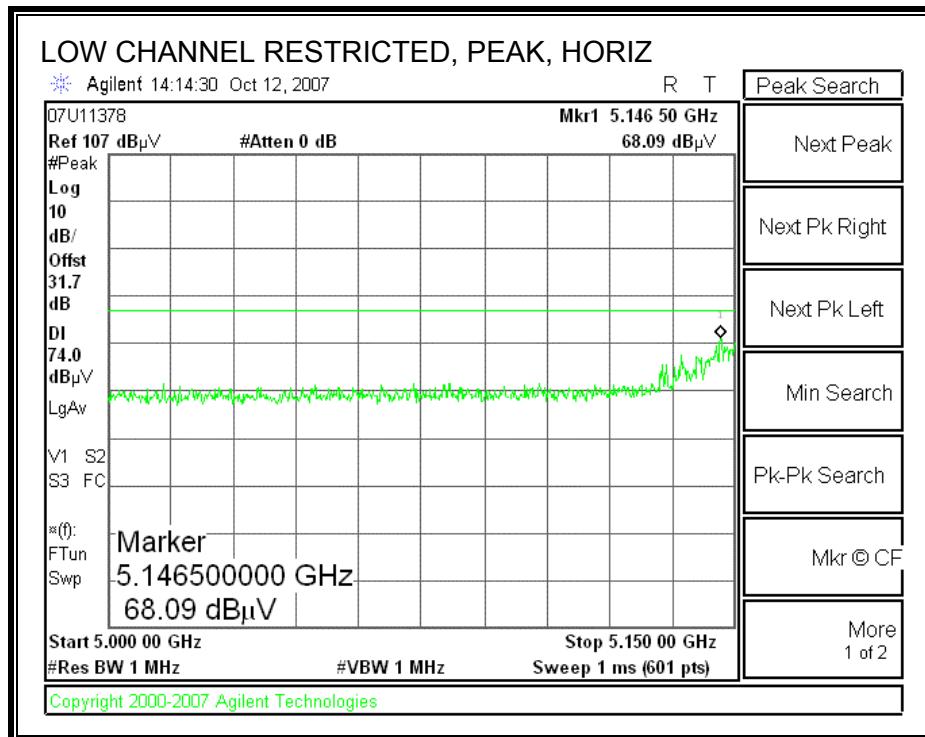
## **HARMONICS AND SPURIOUS EMISSIONS**

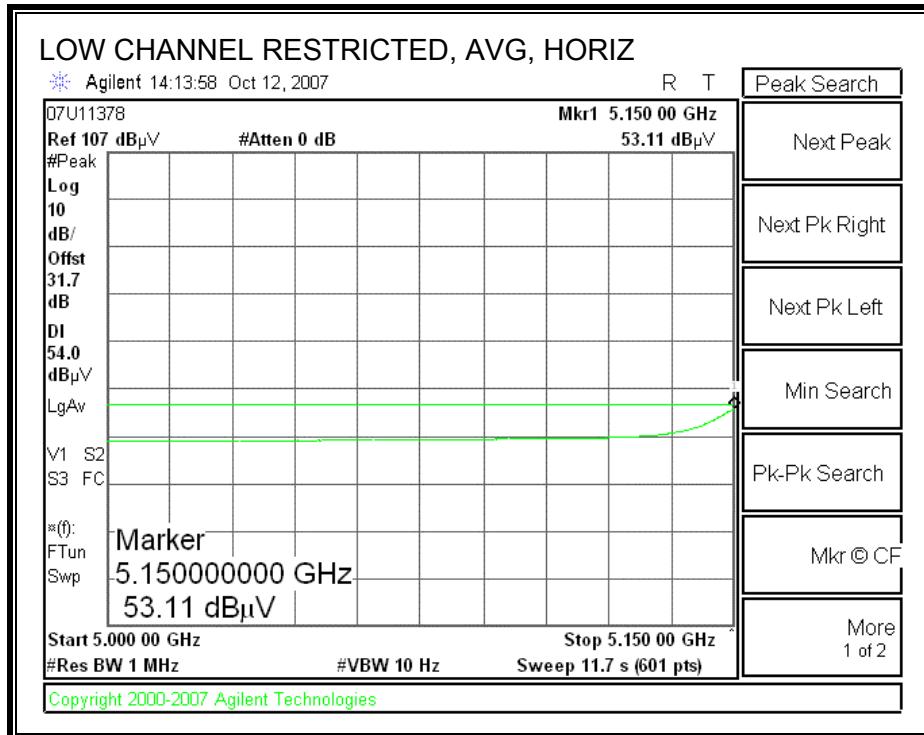
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																							
<p>Company: Toshiba Project #: 07U11378 Date: 10/13/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: TX, 5.2GHz Legacy mode</p> <p><b>Test Equipment:</b></p> <table border="1"> <tr> <td>Horn 1-18GHz</td> <td>Pre-amplifier 1-26GHz</td> <td>Pre-amplifier 26-40GHz</td> <td colspan="4">Horn &gt; 18GHz</td> <td>Limit</td> </tr> <tr> <td>T60; S/N: 2238 @3m</td> <td>T145 Agilent 3008A005e</td> <td>T88 Miteq 26-40GHz</td> <td colspan="4">T39; ARA 18-26GHz; S/N:1013</td> <td>FCC 15.205</td> </tr> <tr> <td colspan="18">Hi Frequency Cables</td> </tr> <tr> <td colspan="3">2 foot cable</td> <td colspan="3">3 foot cable</td> <td colspan="3">12 foot cable</td> <td colspan="3">HPF</td> <td colspan="3">Reject Filter</td> <td colspan="3">Peak Measurements RBW=VBW=1MHz</td> </tr> <tr> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3">B-5m Chamber</td> <td colspan="3">HPF_7.6GHz</td> <td colspan="3"></td> <td colspan="3">Average Measurements RBW=1MHz, VBW=10Hz</td> </tr> </table>																		Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit	T60; S/N: 2238 @3m	T145 Agilent 3008A005e	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			Peak Measurements RBW=VBW=1MHz									B-5m Chamber			HPF_7.6GHz						Average Measurements RBW=1MHz, VBW=10Hz		
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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)																																																																								
<b>Low Ch</b>																																																																																							
15.540	3.0	43.5	32.0	38.0	12.9	-32.3	0.0	0.7	62.8	51.3	74	54	-11.2	-2.7	V																																																																								
15.540	3.0	45.0	32.5	38.0	12.9	-32.3	0.0	0.7	64.3	51.8	74	54	-9.7	-2.2	H																																																																								
<b>Mid Ch</b>																																																																																							
15.780	3.0	44.0	32.7	37.9	13.0	-32.2	0.0	0.7	63.4	52.1	74	54	-10.6	-1.9	V																																																																								
15.780	3.0	45.4	33.0	37.9	13.0	-32.2	0.0	0.7	64.8	52.4	74	54	-9.2	-1.6	H																																																																								
<b>High Ch</b>																																																																																							
10.640	3.0	42.7	31.0	37.3	11.0	-34.2	0.0	0.8	57.5	45.8	74	54	-16.5	-8.2	V																																																																								
15.960	3.0	44.6	32.0	37.8	13.1	-32.2	0.0	0.7	64.0	51.4	74	54	-10.0	-2.6	V																																																																								
10.640	3.0	44.5	31.5	37.3	11.0	-34.2	0.0	0.8	59.3	46.3	74	54	-14.7	-7.7	H																																																																								
15.960	3.0	46.0	33.0	37.8	13.1	-32.2	0.0	0.7	65.4	52.4	74	54	-8.6	-1.6	H																																																																								
Rev. 4.12.7																																																																																							
<b>Note: No other emissions were detected above the system noise floor.</b>																																																																																							
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																																																																																		

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<p>Company: Toshiba  Project #:07U11378  Date: 11/20/2007  Test Engineer: Chin Pang  Configuration: EUT only  Mode: TX, a mode, Legacy</p>																																																																																																																																																																																																																																																																																																																																																		
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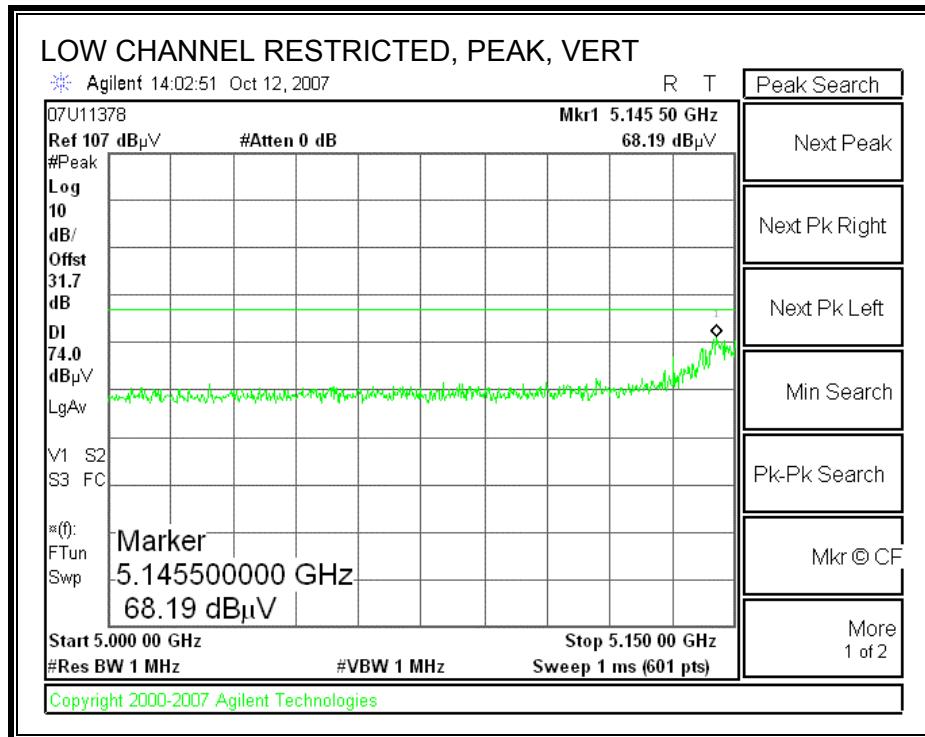
### 7.1.2. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT0 MODE IN THE 5.2 GHz BAND

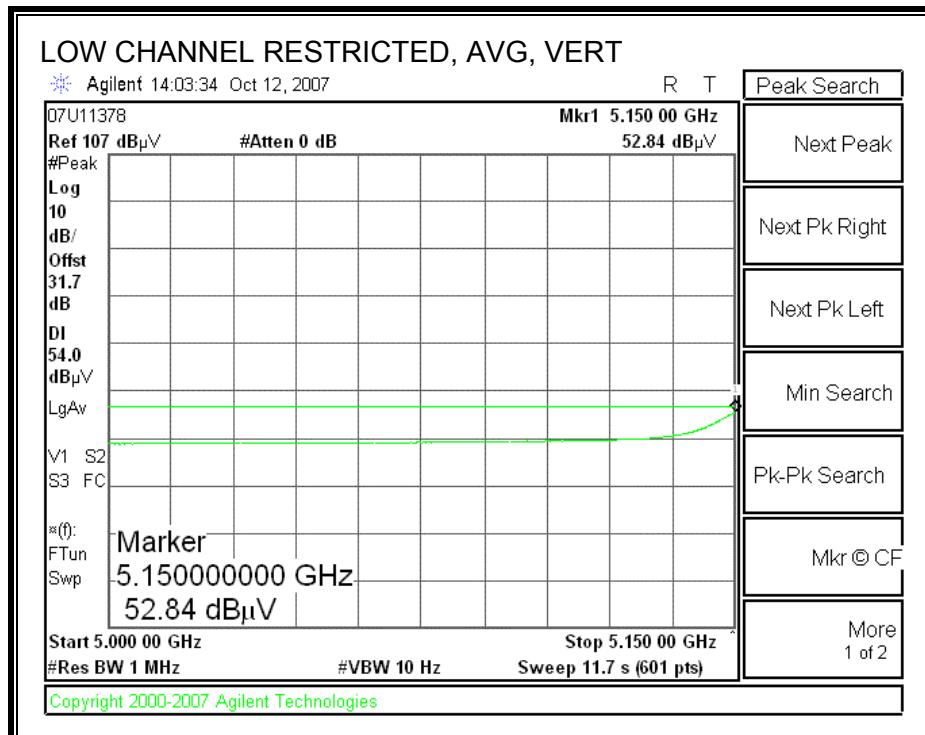
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



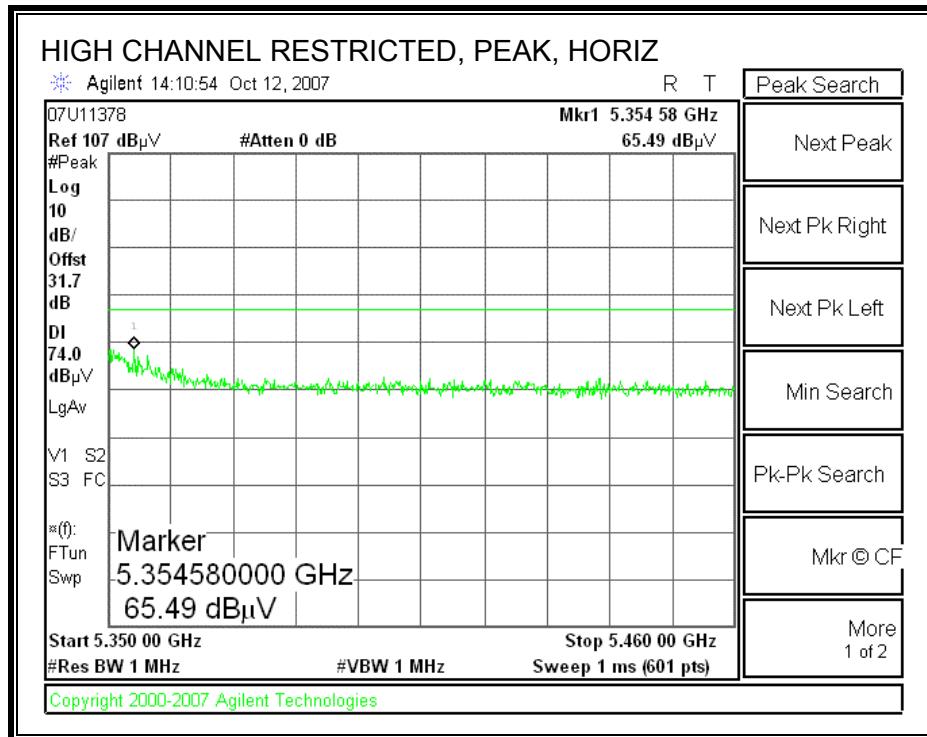


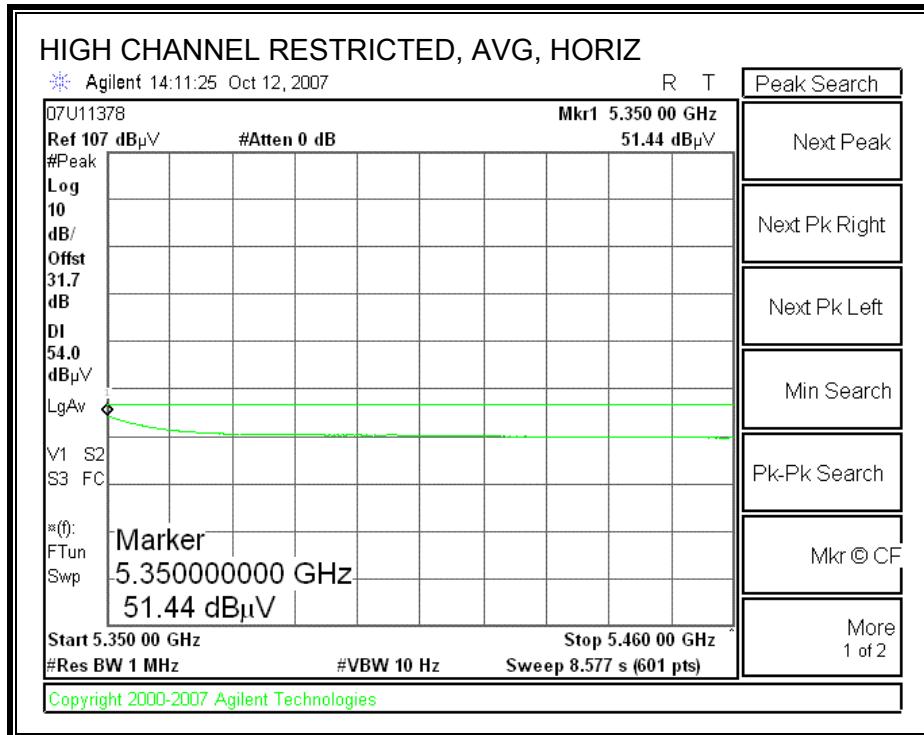
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



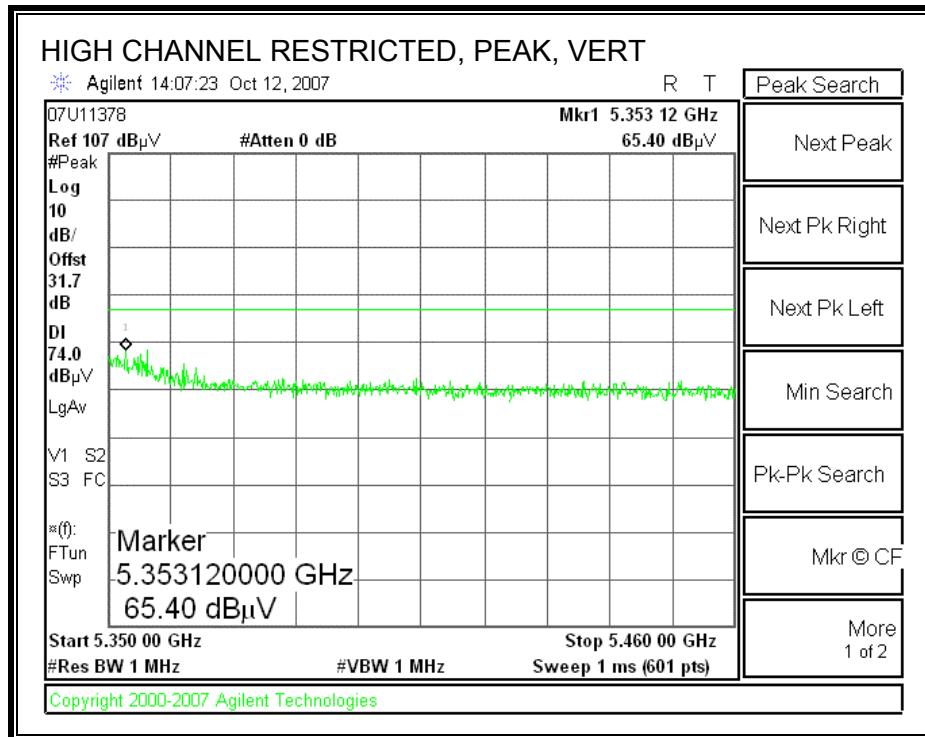


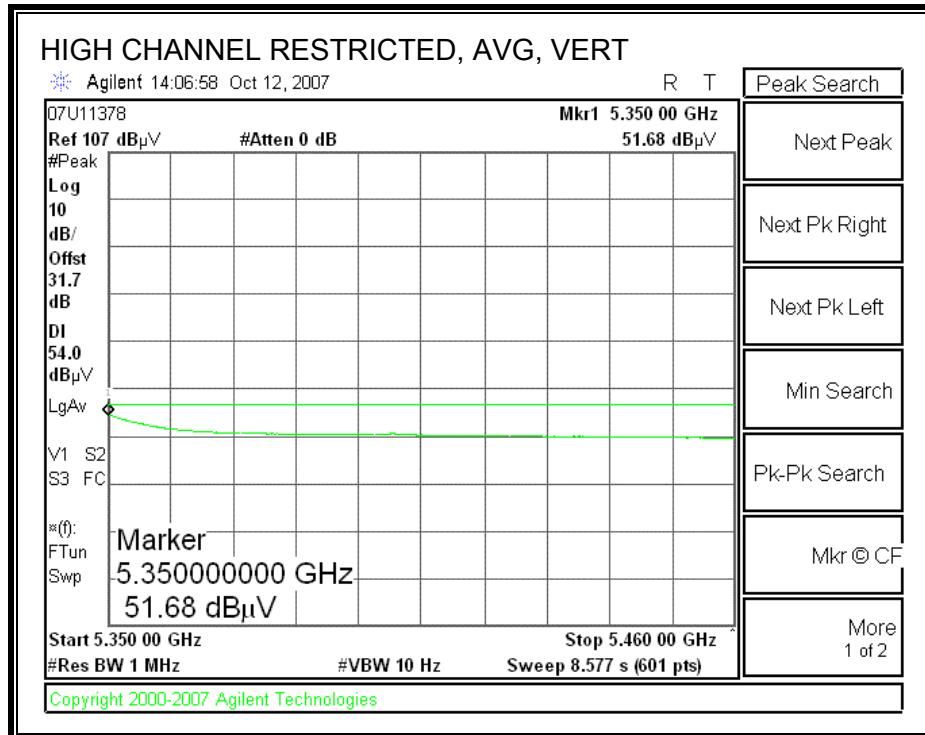
## **RESTRICTED BANDEdge (HIGH CHANNEL, HORIZONTAL)**





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





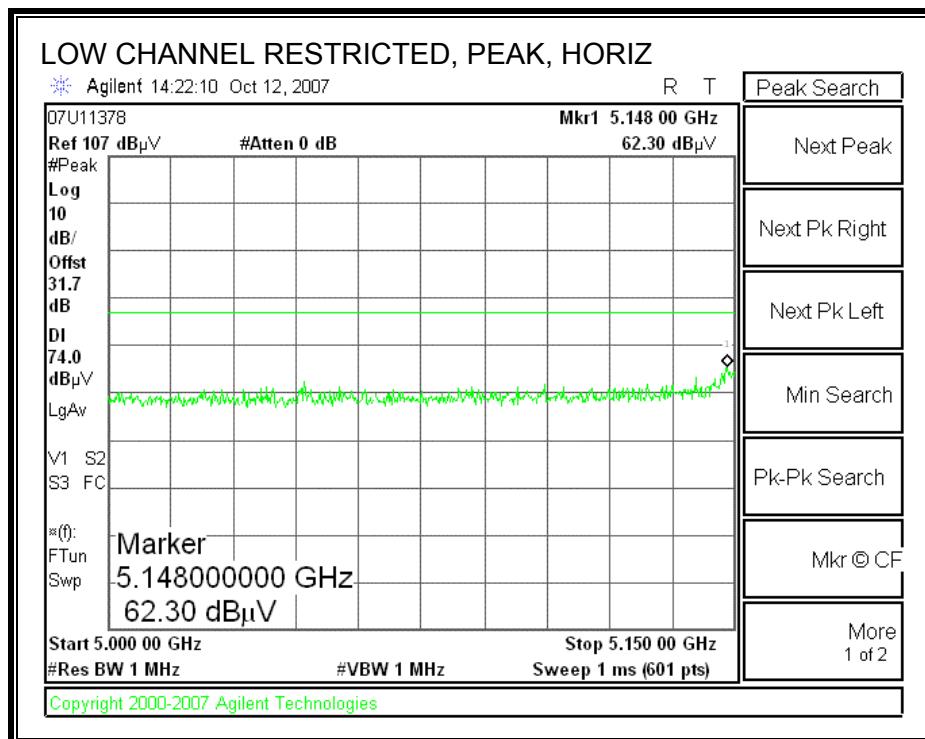
## HARMONICS AND SPURIOUS EMISSIONS

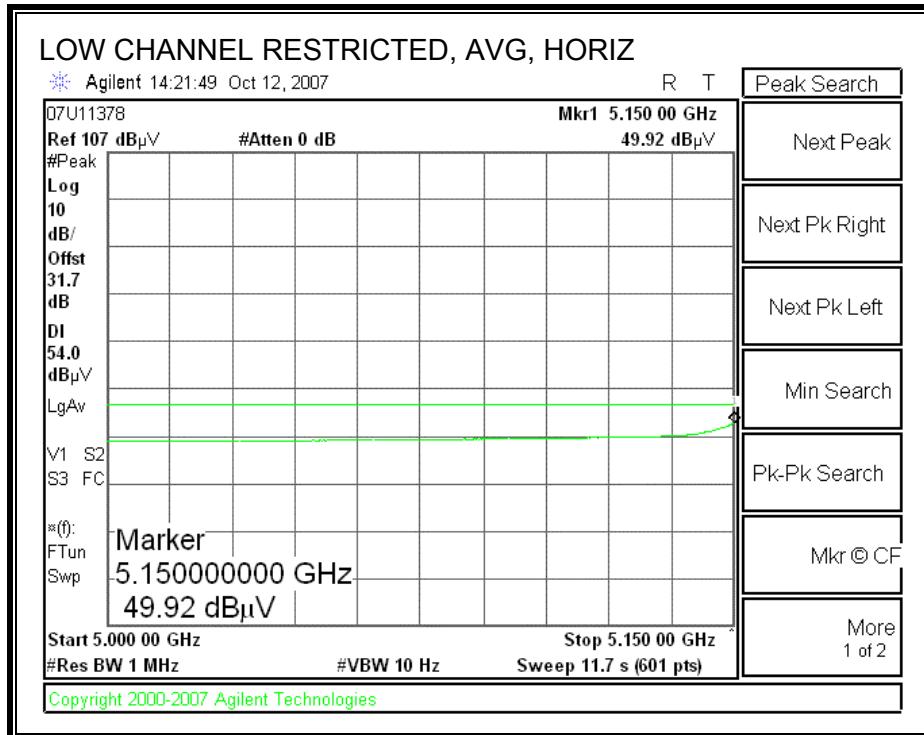
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High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																																																																																																																																											
Company: Toshiba Project #:07U11378 Date: 11/20/2007 Test Engineer: Chin Pang Configuration: EUT only Mode: TX. a mode, 20MHz HT0																																																																																																																																																																																																											
<b>Test Equipment:</b>																																																																																																																																																																																																											
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T119; S/N: 29301 @3m		T34 HP 8449B									FCC 15.205																																																																																																																																																																																																
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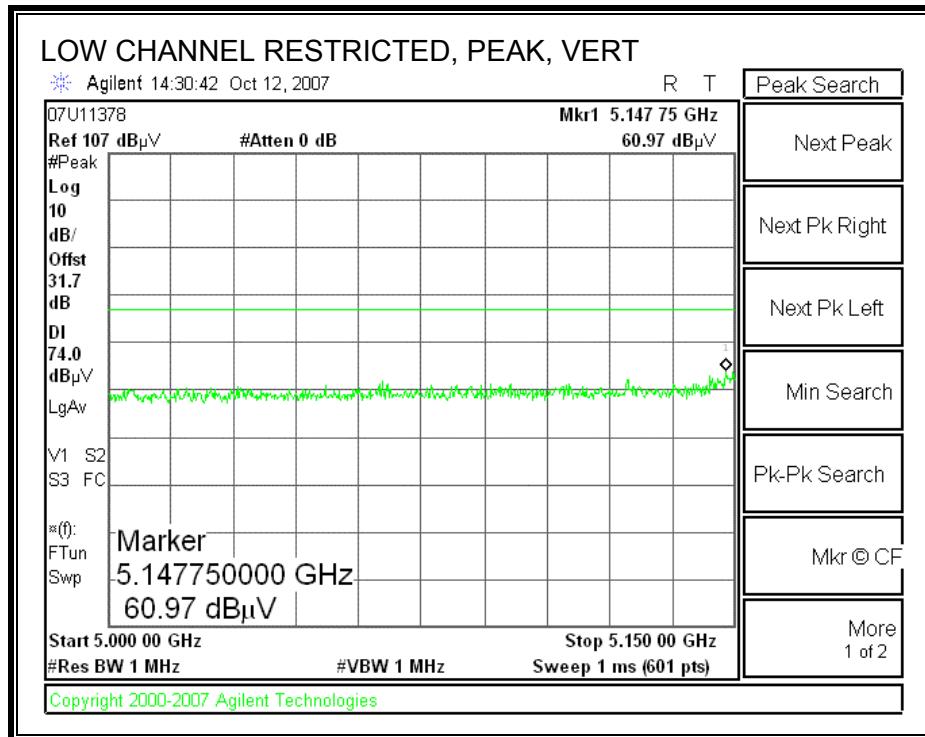
### 7.1.3. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT8 MODE IN THE 5.2 GHz BAND

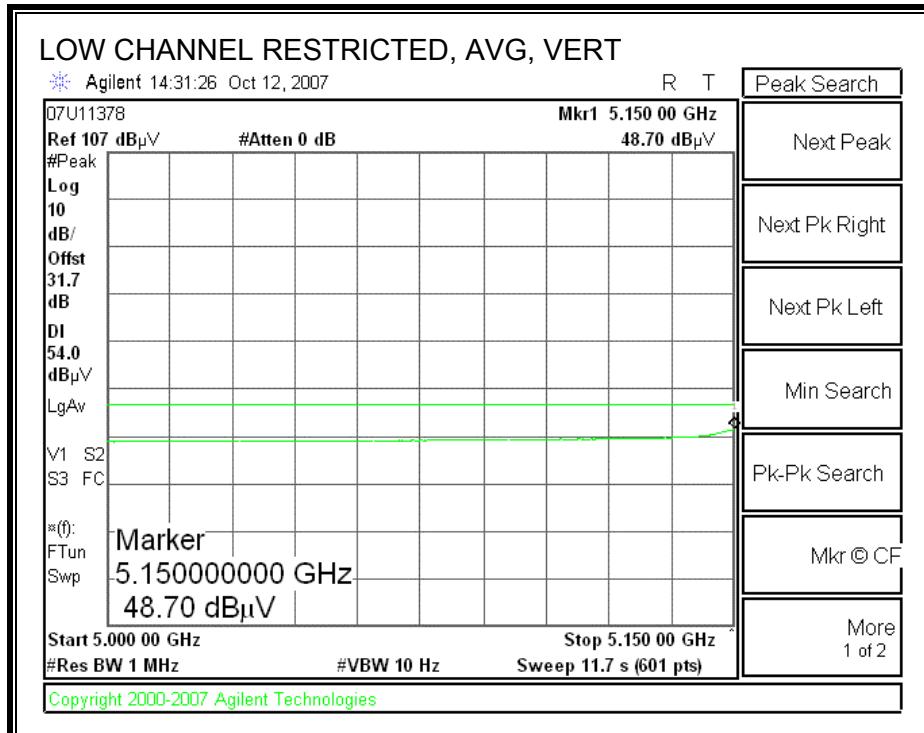
#### RESTRICTED BANDEdge (LOW CHANNEL, HORIZONTAL)



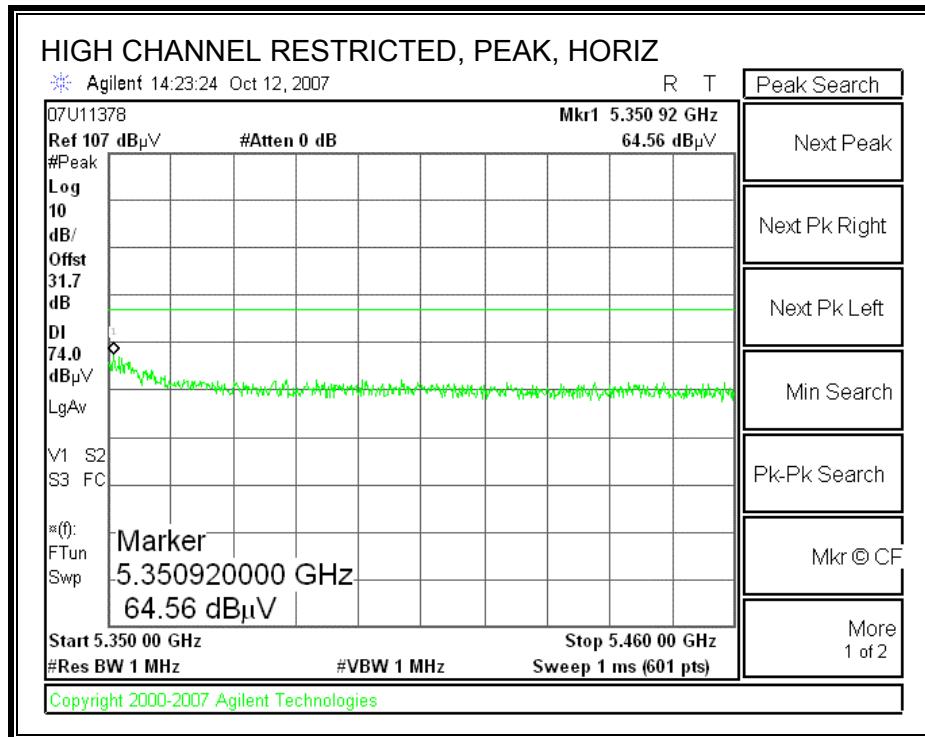


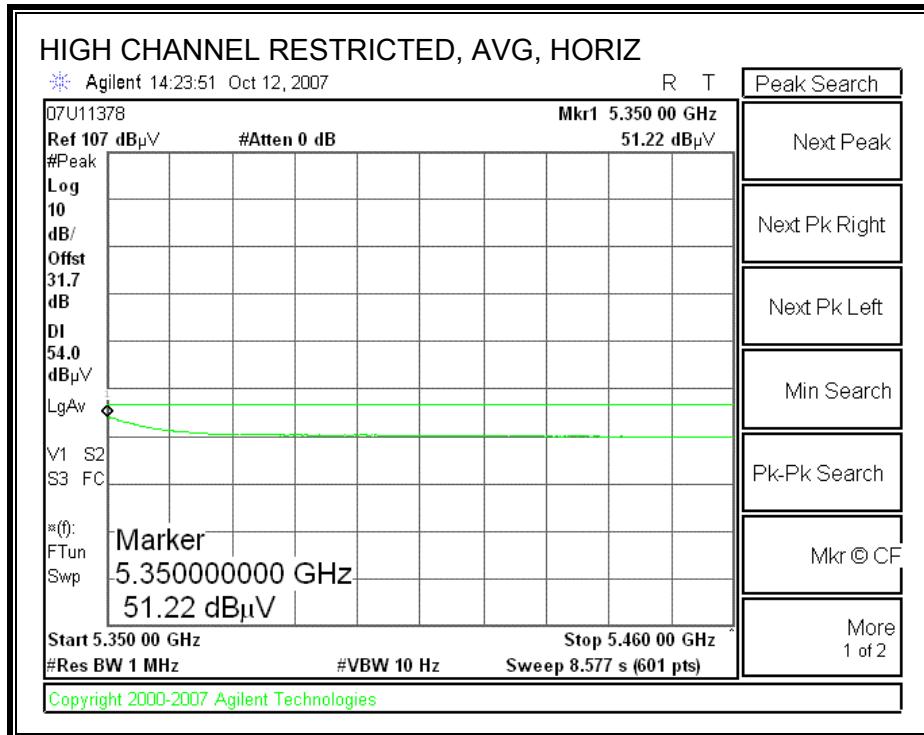
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



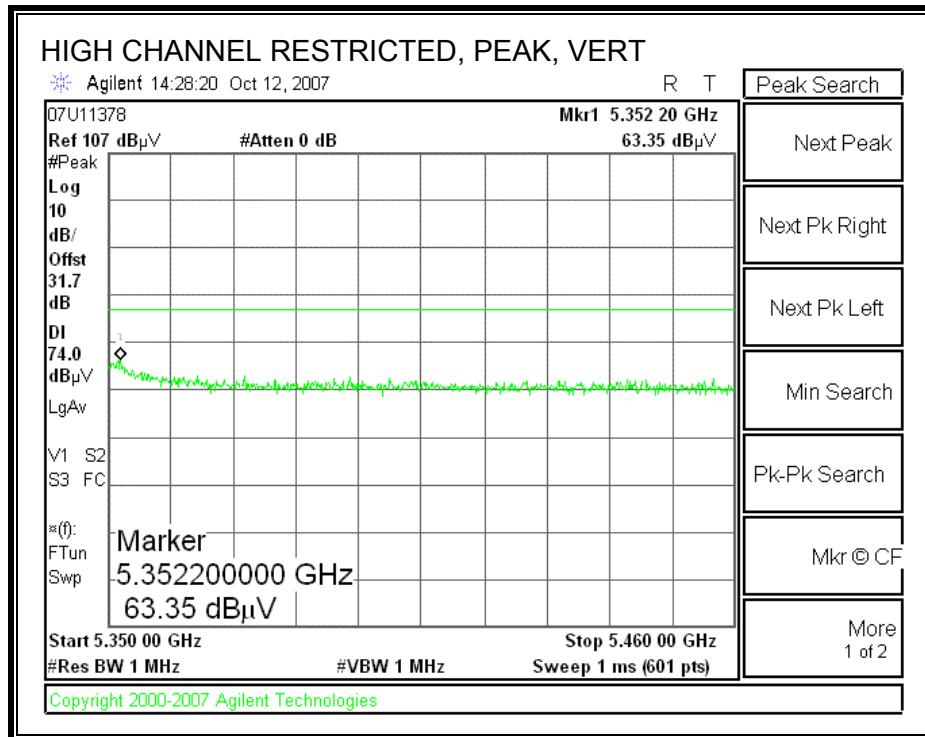


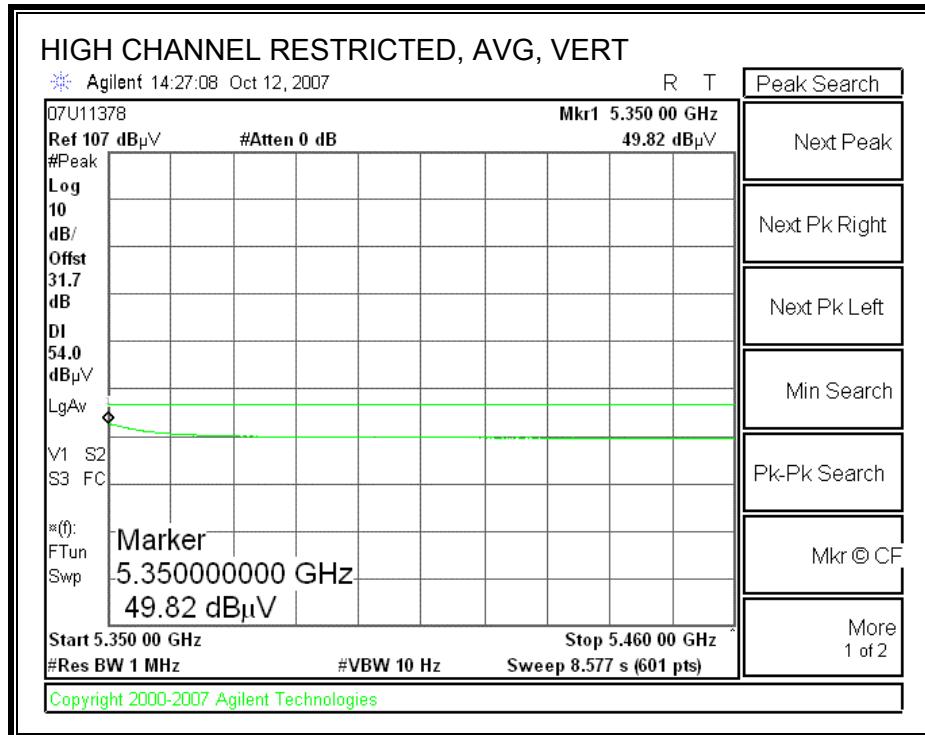
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





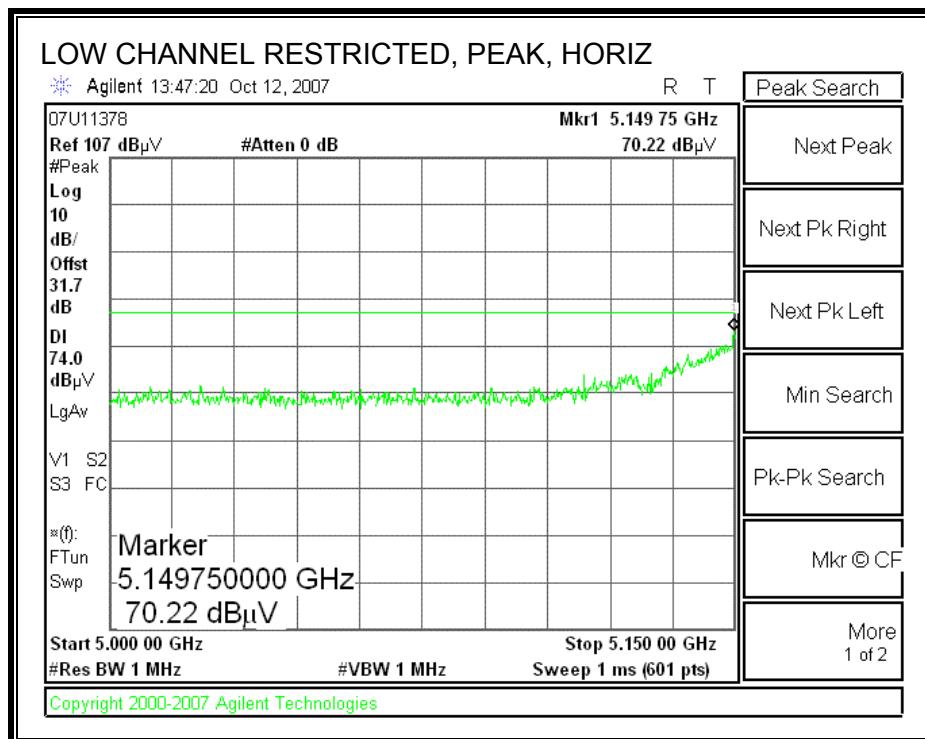
## HARMONICS AND SPURIOUS EMISSIONS

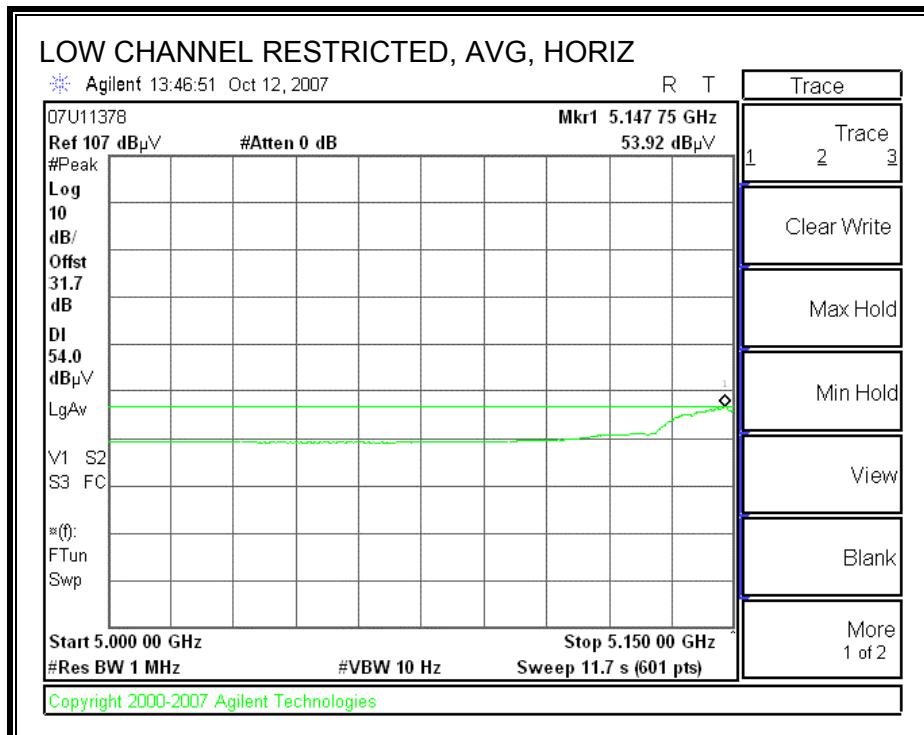
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: Toshiba Project #: 07U11378 Date: 10/13/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: TX, 5.2GHz HT8 mode															
<b>Test Equipment:</b>															
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit							
T60; S/N: 2238 @3m		T145 Agilent 3008A005c		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		<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz					
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<b>Mid Ch</b>															
15.780	3.0	43.0	32.5	37.9	13.0	-32.2	0.0	0.7	62.4	51.9	74	54	-11.6	-2.1	V
15.780	3.0	45.0	33.0	37.9	13.0	-32.2	0.0	0.7	64.4	52.4	74	54	-9.6	-1.6	H
<b>High Ch</b>															
10.640	3.0	42.5	30.6	37.3	11.0	-34.2	0.0	0.8	57.3	45.4	74	54	-16.7	-8.6	V
15.960	3.0	44.6	32.3	37.8	13.1	-32.2	0.0	0.7	64.0	51.7	74	54	-10.0	-2.3	V
10.640	3.0	44.3	32.0	37.3	11.0	-34.2	0.0	0.8	59.1	46.8	74	54	-14.9	-7.2	H
15.960	3.0	45.5	32.6	37.8	13.1	-32.2	0.0	0.7	64.9	52.0	74	54	-9.1	-2.0	H
Rev. 412.7															
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										

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
<p>Company: Toshiba  Project #:07U11378  Date: 11/20/2007  Test Engineer: Chin Pang  Configuration: EUT only  Mode: a mode, 20MHz HT8, TX</p>															
<u>Test Equipment:</u>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 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									
<p><u>Peak Measurements</u>  RBW=VBW=1MHz  <u>Average Measurements</u>  RBW=1MHz ; VBW=10Hz</p>															
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)
<b>5200MHz</b>															
15.600	3.0	49.8	35.8	38.7	5.6	-32.2	0.0	0.7	62.7	48.7	74	54	-11.3	-5.3	V
15.600	3.0	48.0	35.4	38.7	5.6	-32.2	0.0	0.7	60.9	48.3	74	54	-13.1	-5.7	H
<b>5240MHz</b>															
15.720	3.0	49.0	35.7	38.8	5.6	-32.2	0.0	0.7	62.0	48.7	74	54	-12.0	-5.3	V
15.720	3.0	48.0	35.6	38.8	5.6	-32.2	0.0	0.7	61.0	48.6	74	54	-13.0	-5.4	H
<b>5300MHz</b>															
10.600	3.0	56.3	39.5	36.8	4.1	-32.6	0.0	0.8	65.4	48.6	74	54	-8.6	-5.4	V
15.900	3.0	49.3	35.8	38.8	5.7	-32.1	0.0	0.7	62.4	48.9	74	54	-11.6	-5.1	V
10.600	3.0	54.0	37.1	36.8	4.1	-32.6	0.0	0.8	63.1	46.2	74	54	-10.9	-7.8	H
15.900	3.0	48.4	36.2	38.8	5.7	-32.1	0.0	0.7	61.5	49.3	74	54	-12.5	-4.7	H
Rev. 5.1.6															
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										

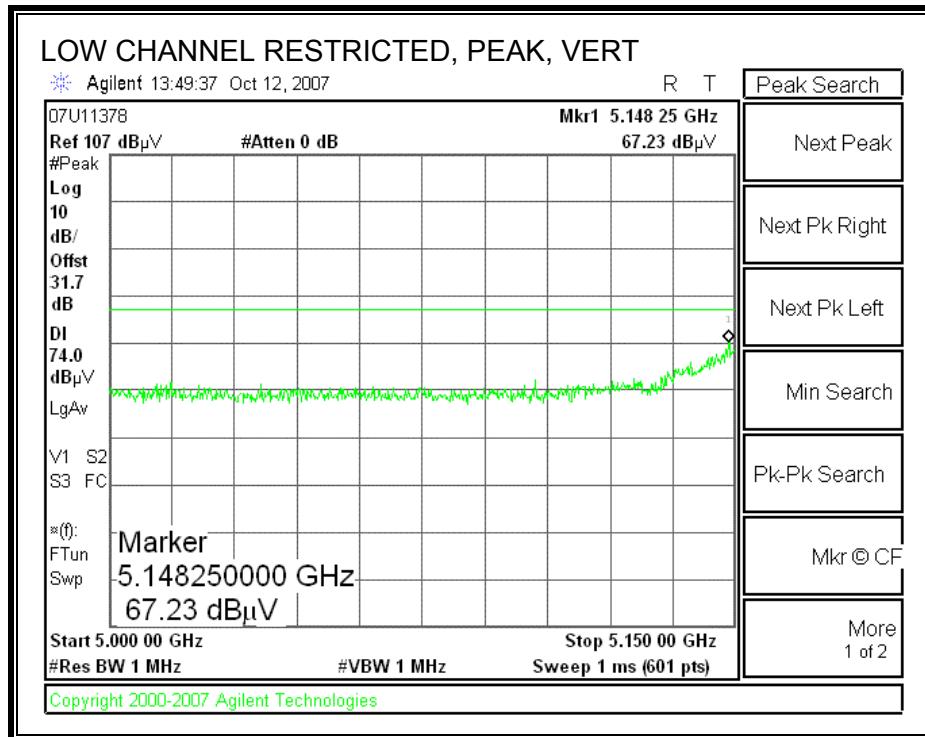
### 7.1.4. TRANSMITTER ABOVE 1 GHz FOR 802.11n 40MHz HT0 MODE IN THE 5.2 GHz BAND

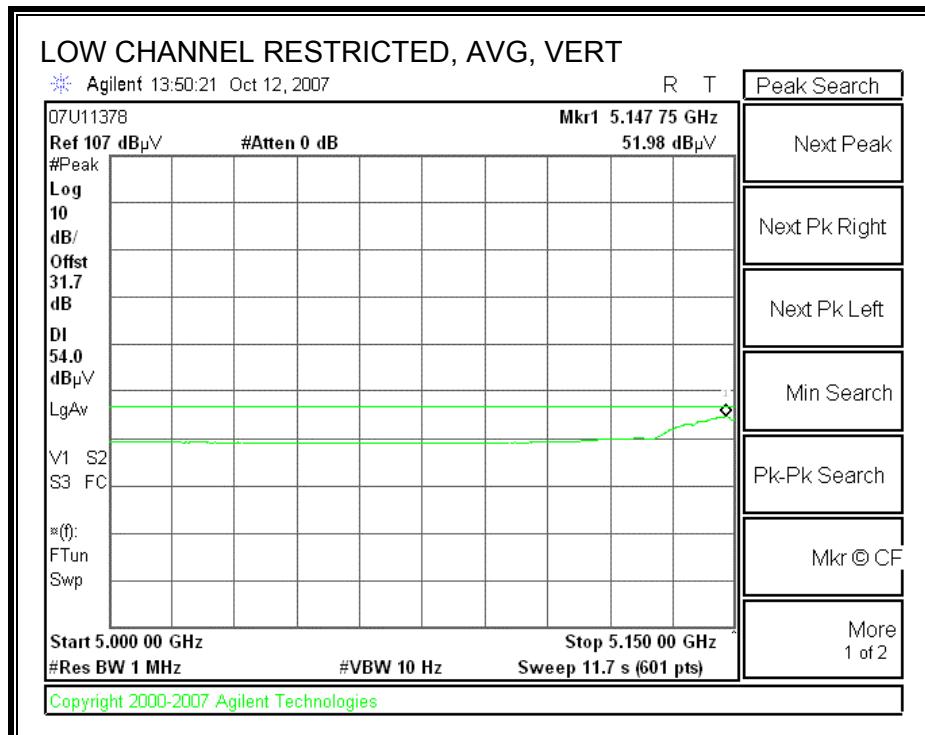
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



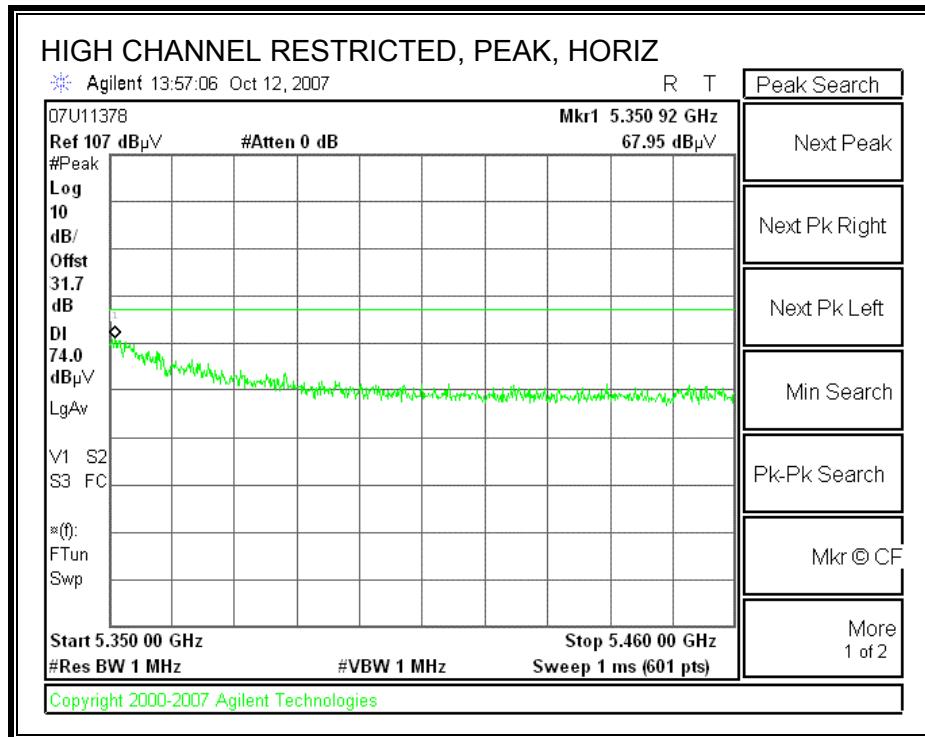


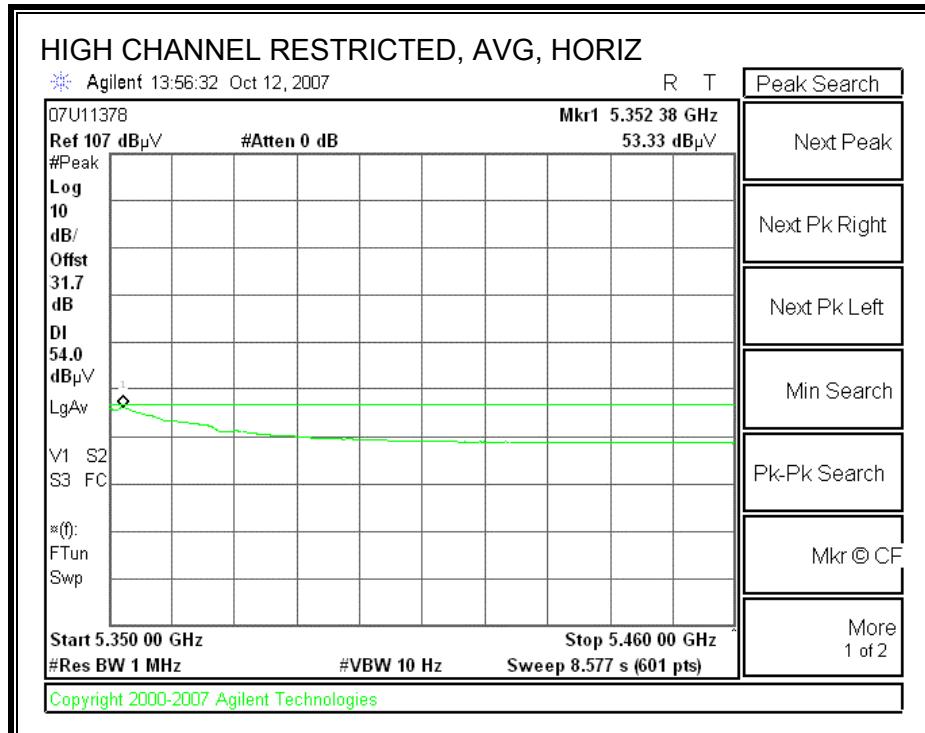
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



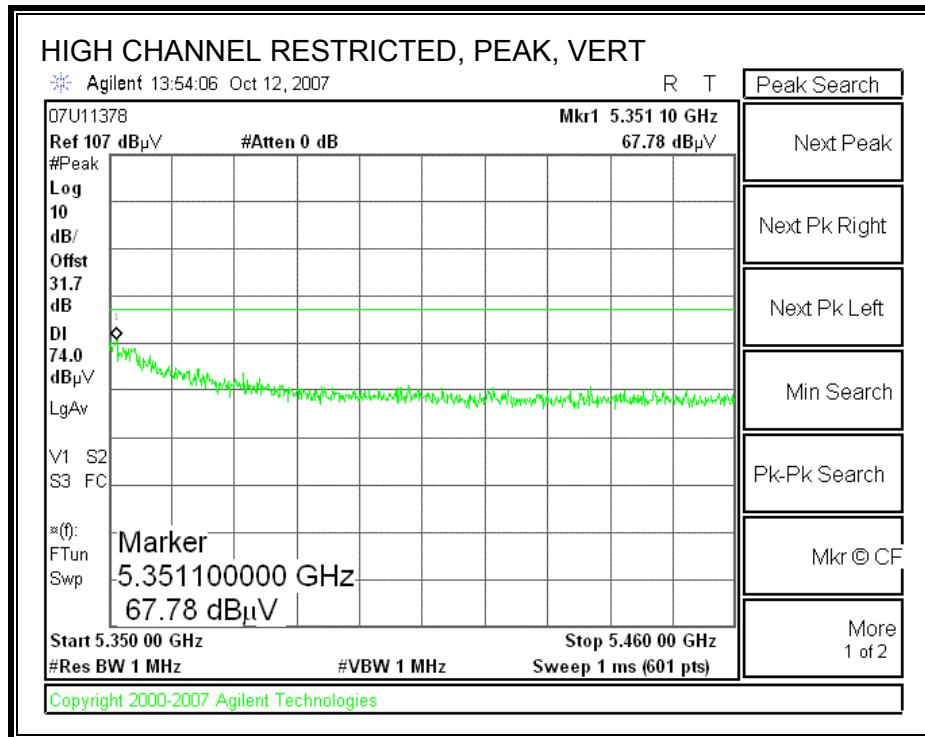


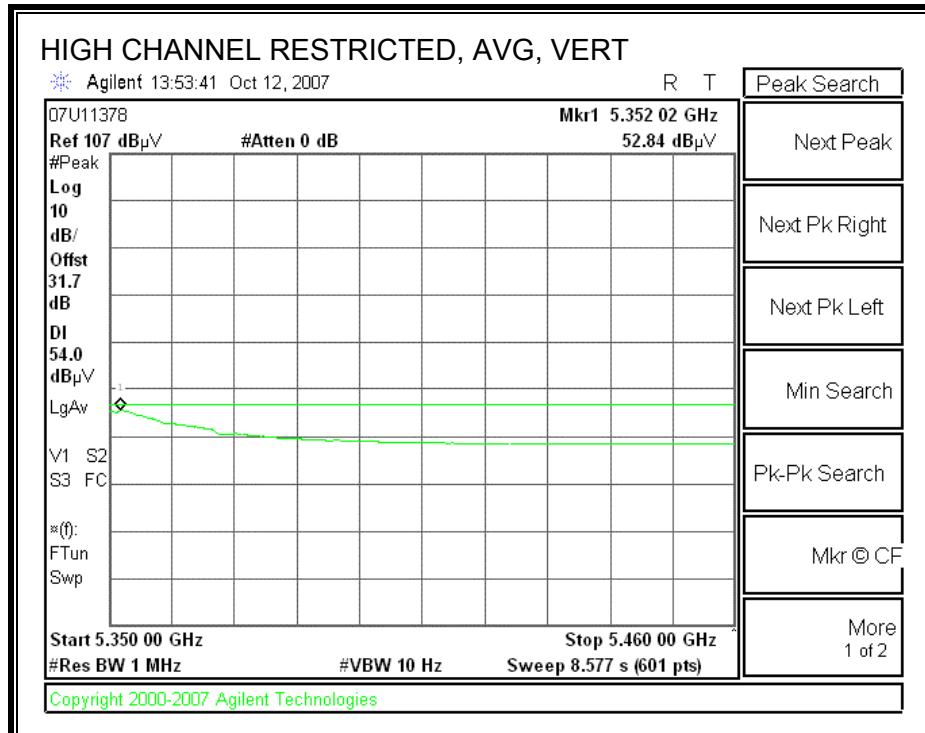
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





### RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





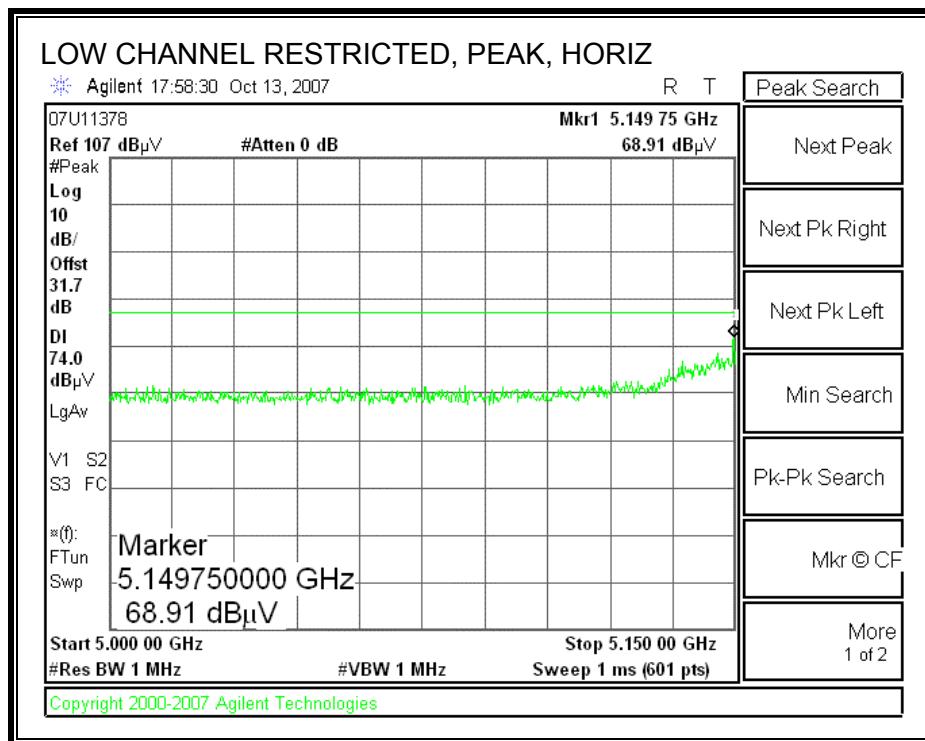
## HARMONICS AND SPURIOUS EMISSIONS

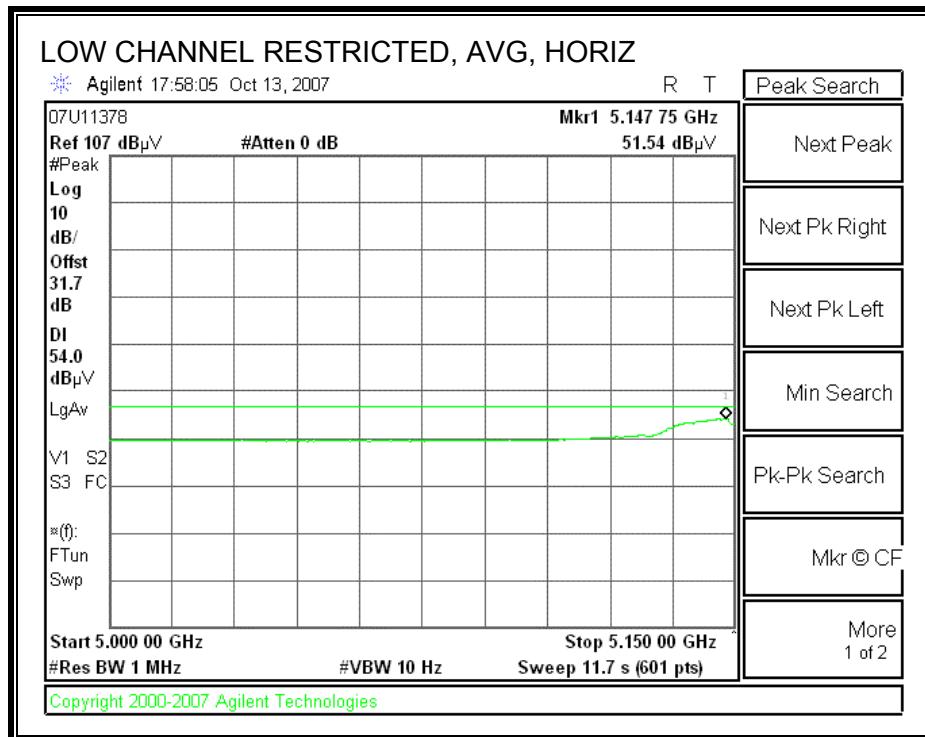
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: Toshiba Project #: 07U11378 Date: 10/13/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: TX, 5.2GHz 40MHz HT0 mode															
Test Equipment:															
Horn 1-18GHz T60; S/N: 2238 @3m			Pre-amplifier 1-26GHz T145 Agilent 3008A0056			Pre-amplifier 26-40GHz T88 Miteq 26-40GHz			Horn > 18GHz T39; ARA 18-26GHz; S/N:1013			Limit FCC 15.205			
Hi Frequency Cables 2 foot cable      3 foot cable      12 foot cable      B-5m Chamber															
HPF      Reject Filter															
Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz															
f      Dist      Read Pk      Read Avg.      AF      CL      Amp      D Corr      Fltr      Peak      Avg      Pk Lim      Avg Lim      Pk Mar      Avg Mar      Notes GHz      (m)      dBuV      dBuV      dB/m      dB      dB      dB      dB      dBuV/m      dBuV/m      dBuV/m      dB      dB															
Low Ch, 5190MHz															
15.570	3.0	42.0	30.0	38.0	12.9	-32.3	0.0	0.7	61.4	49.4	74	54	-12.6	-4.6	V
15.570	3.0	43.4	31.7	38.0	12.9	-32.3	0.0	0.7	62.8	51.1	74	54	-11.2	-2.9	H
Mid Ch, 5270MHz															
15.810	3.0	43.6	31.9	37.9	13.0	-32.2	0.0	0.7	63.0	51.3	74	54	-11.0	-2.7	V
15.810	3.0	45.3	32.8	37.9	13.0	-32.2	0.0	0.7	64.7	52.2	74	54	-9.3	-1.8	H
High Ch, 5310MHz															
10.610	3.0	46.0	34.0	37.4	10.9	-34.3	0.0	0.8	60.8	48.8	74	54	-13.2	-5.2	V
15.930	3.0	45.0	32.6	37.8	13.1	-32.2	0.0	0.7	64.4	52.0	74	54	-9.6	-2.0	V
10.610	3.0	47.0	35.4	37.4	10.9	-34.3	0.0	0.8	61.8	50.2	74	54	-12.2	-3.8	H
15.930	3.0	46.2	33.4	37.8	13.1	-32.2	0.0	0.7	65.6	52.8	74	54	-8.4	-1.2	H
Rev. 4.12.7 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					

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																																																																																																																																																																																																																																																																																										
<p>Company: Toshiba Project #: 07U11378 Date: 11/20/2007 Test Engineer: Chin Pang Configuration: EUT only Mode: TX, n mode, 40MHz HT0</p> <p><b>Test Equipment:</b></p> <table border="1"> <tr> <td>Horn 1-18GHz</td> <td>Pre-amplifier 1-26GHz</td> <td>Pre-amplifier 26-40GHz</td> <td colspan="4">Horn &gt; 18GHz</td> <td>Limit</td> </tr> <tr> <td>T119; S/N: 29301 @3m</td> <td>T34 HP 8449B</td> <td></td> <td colspan="4"></td> <td>FCC 15.205</td> </tr> <tr> <td colspan="18">Hi Frequency Cables</td> </tr> <tr> <td colspan="3">2 foot cable</td> <td colspan="3">3 foot cable</td> <td colspan="3">12 foot cable</td> <td colspan="3">HPF</td> <td colspan="3">Reject Filter</td> <td colspan="3">Peak Measurements</td> </tr> <tr> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3">HPF_7.6GHz</td> <td colspan="3"></td> <td colspan="3">RBW=VBW=1MHz</td> </tr> <tr> <td colspan="18">Average Measurements</td> </tr> <tr> <td colspan="18">RBW=1MHz, VBW=10Hz</td> </tr> <tr> <th>f GHz</th> <th>Dist (m)</th> <th>Read Pk dBuV</th> <th>Read Avg dBuV</th> <th>AF dB/m</th> <th>CL dB</th> <th>Amp dB</th> <th>D Corr dB</th> <th>Fltr dB</th> <th>Peak dBuV/m</th> <th>Avg dBuV/m</th> <th>Pk Lim dBuV/m</th> <th>Avg Lim dBuV/m</th> <th>Pk Mar dB</th> <th>Avg Mar dB</th> <th>Notes (V/H)</th> </tr> <tr> <td>5230MHz</td> <td></td> </tr> <tr> <td>15.690</td> <td>3.0</td> <td>49.9</td> <td>36.7</td> <td>38.7</td> <td>5.6</td> <td>-32.2</td> <td>0.0</td> <td>0.7</td> <td>62.8</td> <td>49.6</td> <td>74</td> <td>54</td> <td>-11.2</td> <td>-4.4</td> <td>V</td> </tr> <tr> <td>15.690</td> <td>3.0</td> <td>51.3</td> <td>39.0</td> <td>38.7</td> <td>5.6</td> <td>-32.2</td> <td>0.0</td> <td>0.7</td> <td>64.2</td> <td>51.9</td> <td>74</td> <td>54</td> <td>-9.8</td> <td>-2.1</td> <td>H</td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> <tr> <td colspan="18">Rev. 5.1.6</td> </tr> <tr> <td colspan="18">Note: No other emissions were detected above the system noise floor.</td> </tr> <tr> <td>f</td> <td colspan="3">Measurement Frequency</td> <td>Amp</td> <td colspan="3">Preamp Gain</td> <td colspan="3"></td> <td>Avg Lim</td> <td colspan="3">Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td colspan="3">Distance to Antenna</td> <td>D Corr</td> <td colspan="3">Distance Correct to 3 meters</td> <td colspan="3"></td> <td>Pk Lim</td> <td colspan="3">Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td colspan="3">Analyzer Reading</td> <td>Avg</td> <td colspan="3">Average Field Strength @ 3 m</td> <td colspan="3"></td> <td>Avg Mar</td> <td colspan="3">Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td colspan="3">Antenna Factor</td> <td>Peak</td> <td colspan="3">Calculated Peak Field Strength</td> <td colspan="3"></td> <td>Pk Mar</td> <td colspan="3">Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td colspan="3">Cable Loss</td> <td>HPF</td> <td colspan="3">High Pass Filter</td> <td colspan="3"></td> <td></td> <td colspan="3"></td> </tr> </table>																		Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit	T119; S/N: 29301 @3m	T34 HP 8449B						FCC 15.205	Hi Frequency Cables																		2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			Peak Measurements												HPF_7.6GHz						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)	5230MHz																15.690	3.0	49.9	36.7	38.7	5.6	-32.2	0.0	0.7	62.8	49.6	74	54	-11.2	-4.4	V	15.690	3.0	51.3	39.0	38.7	5.6	-32.2	0.0	0.7	64.2	51.9	74	54	-9.8	-2.1	H																																																	Rev. 5.1.6																		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									
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit																																																																																																																																																																																																																																																																																																																																																			
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15.690	3.0	51.3	39.0	38.7	5.6	-32.2	0.0	0.7	64.2	51.9	74	54	-9.8	-2.1	H																																																																																																																																																																																																																																																																																																																																											
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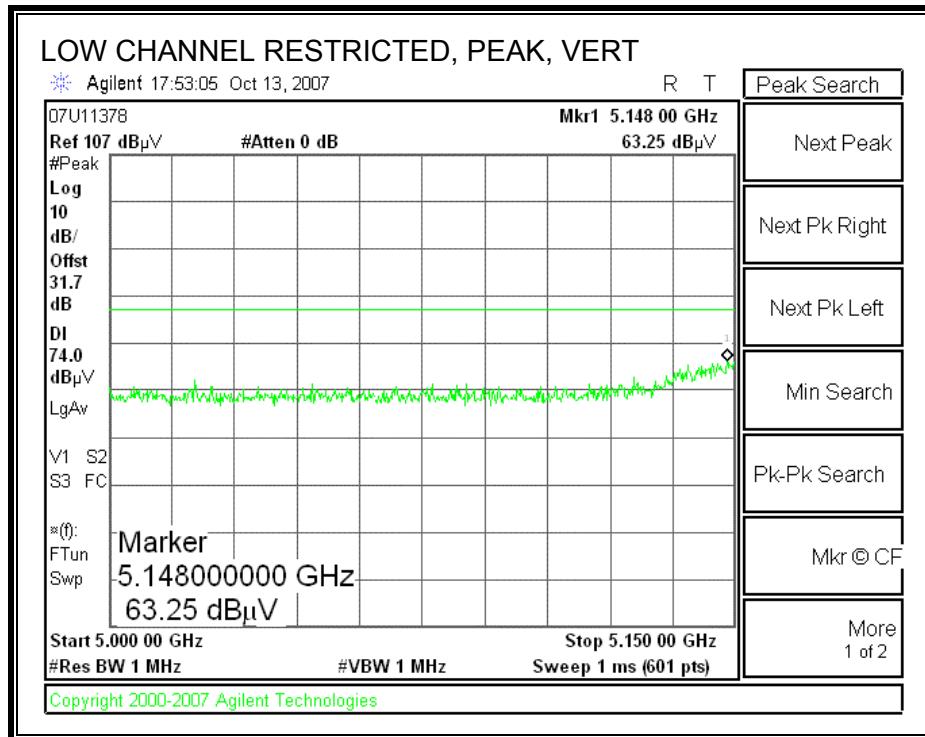
### 7.1.5. TRANSMITTER ABOVE 1 GHz FOR 802.11n 40MHz HT8 MODE IN THE 5.2 GHz BAND

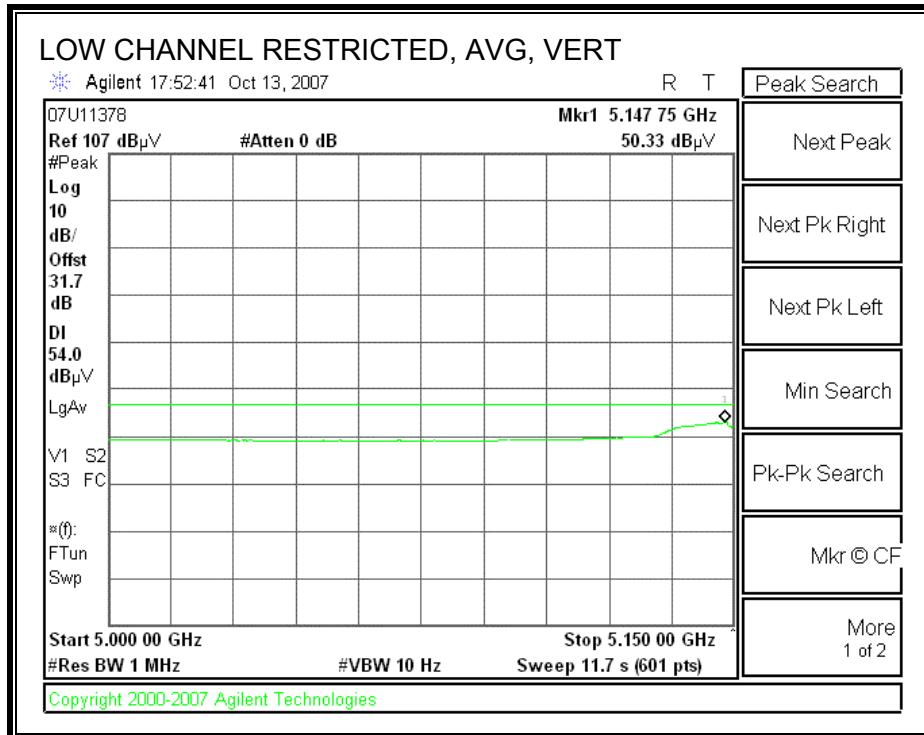
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



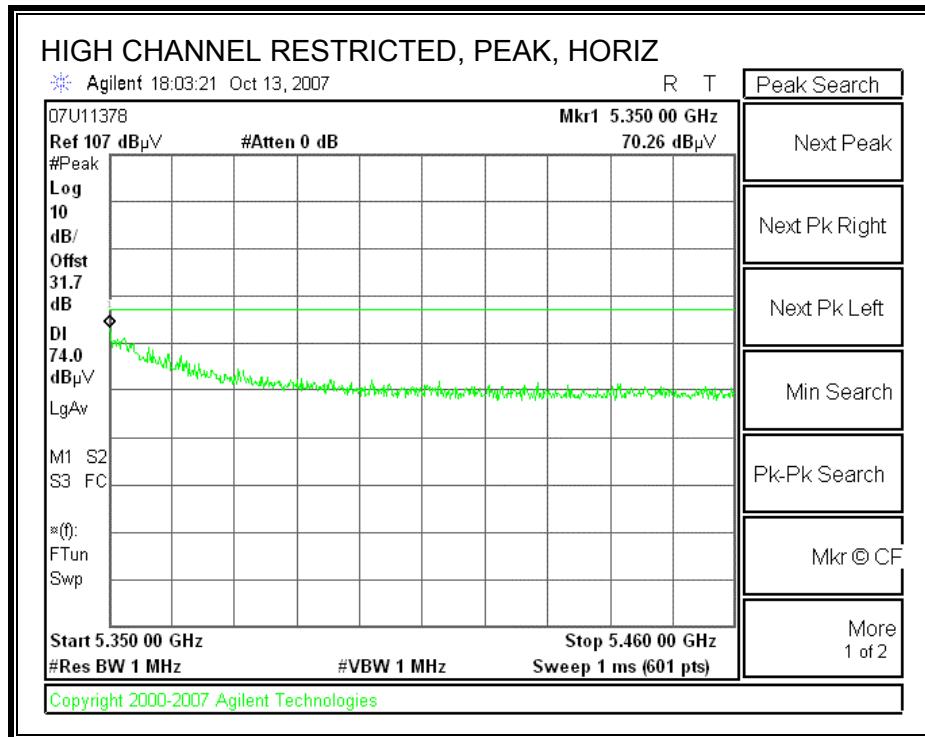


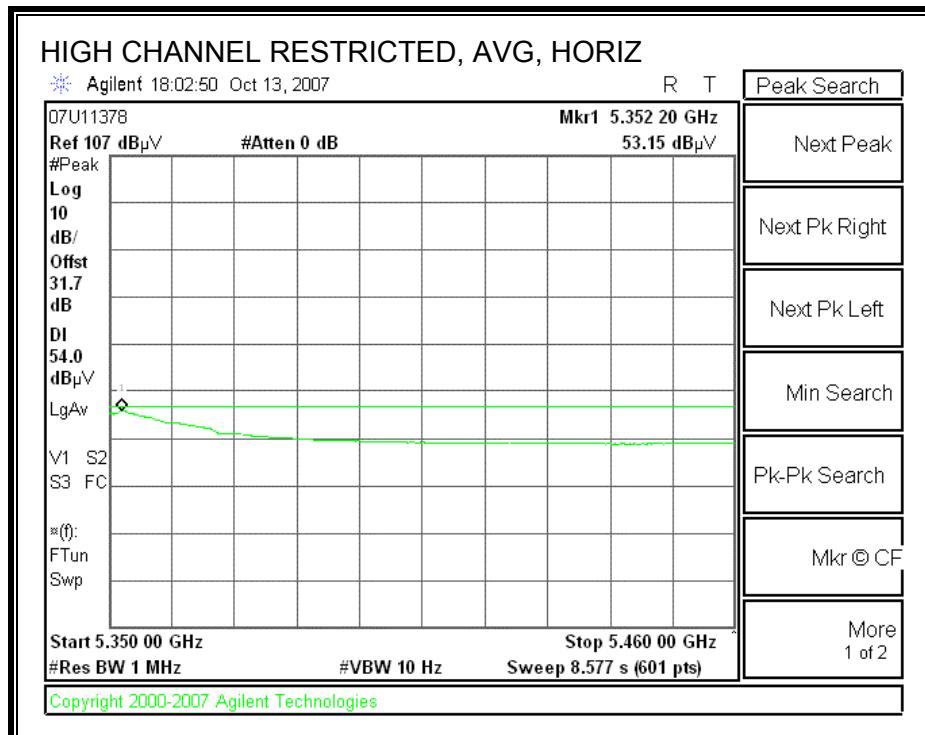
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



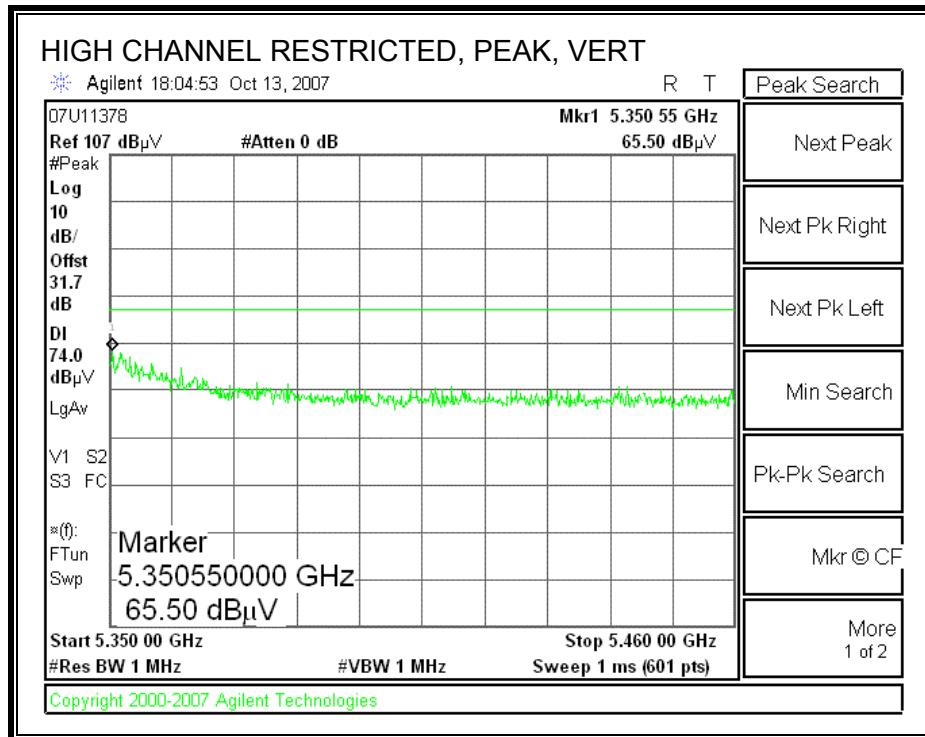


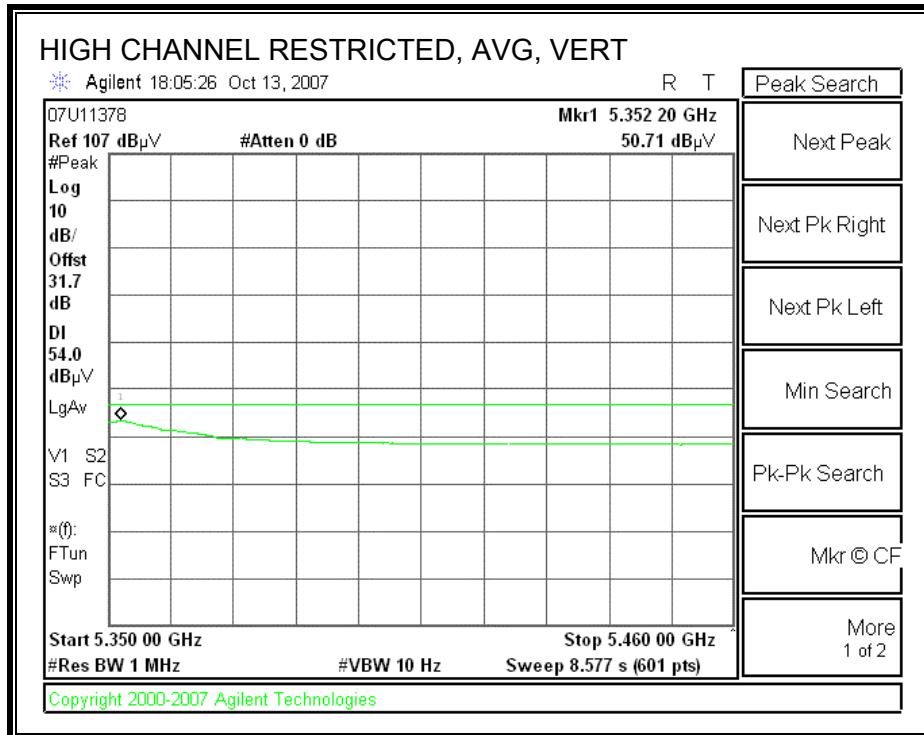
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





## HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: Toshiba Project #: 07U11378 Date: 10/13/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: TX, 5.2GHz 40MHz HT8 mode															
<b>Test Equipment:</b>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit			
T60; S/N: 2238 @3m			T145 Agilent 3008A005c			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 B-5m Chamber      HPF      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	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)
<b>Low Ch, 5190MHz</b>															
15.570	3.0	43.0	31.0	38.0	12.9	-32.3	0.0	0.7	62.4	50.4	74	54	-11.6	-3.6	V
15.570	3.0	45.0	32.7	38.0	12.9	-32.3	0.0	0.7	64.4	52.1	74	54	-9.6	-1.9	H
<b>Mid Ch, 5270MHz</b>															
15.810	3.0	44.0	31.4	37.9	13.0	-32.2	0.0	0.7	63.4	50.8	74	54	-10.6	-3.2	V
15.810	3.0	45.4	33.0	37.9	13.0	-32.2	0.0	0.7	64.8	52.4	74	54	-9.2	-1.6	H
<b>High Ch, 5310MHz</b>															
10.610	3.0	46.0	34.7	37.4	10.9	-34.3	0.0	0.8	60.8	49.5	74	54	-13.2	-4.5	V
15.930	3.0	44.2	32.0	37.8	13.1	-32.2	0.0	0.7	63.6	51.4	74	54	-10.4	-2.6	V
10.610	3.0	47.7	35.4	37.4	10.9	-34.3	0.0	0.8	62.5	50.2	74	54	-11.5	-3.8	H
15.930	3.0	45.6	33.2	37.8	13.1	-32.2	0.0	0.7	65.0	52.6	74	54	-9.0	-1.4	H
Rev. 4.12.7 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					

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: Toshiba Project #:07U11378 Date: 11/20/2007 Test Engineer: Chin Pang Configuration: EUT only Mode: TX. n mode, 40MHz HT8															
<b>Test Equipment:</b>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit			
T119; S/N: 29301 @3m			T34 HP 8449B									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						
<b>Peak Measurements</b> RBW=VBW=1MHz															
<b>Average Measurements</b> RBW=1MHz ; VBW=10Hz															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dBm	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)
5230MHz															
15.690	3.0	50.3	37.8	38.7	5.6	-32.2	0.0	0.7	63.2	50.7	74	54	-10.8	-3.3	V
15.690	3.0	51.9	39.4	38.7	5.6	-32.2	0.0	0.7	64.8	52.3	74	54	-9.2	-1.7	H
Rev. 5.1.6															
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												

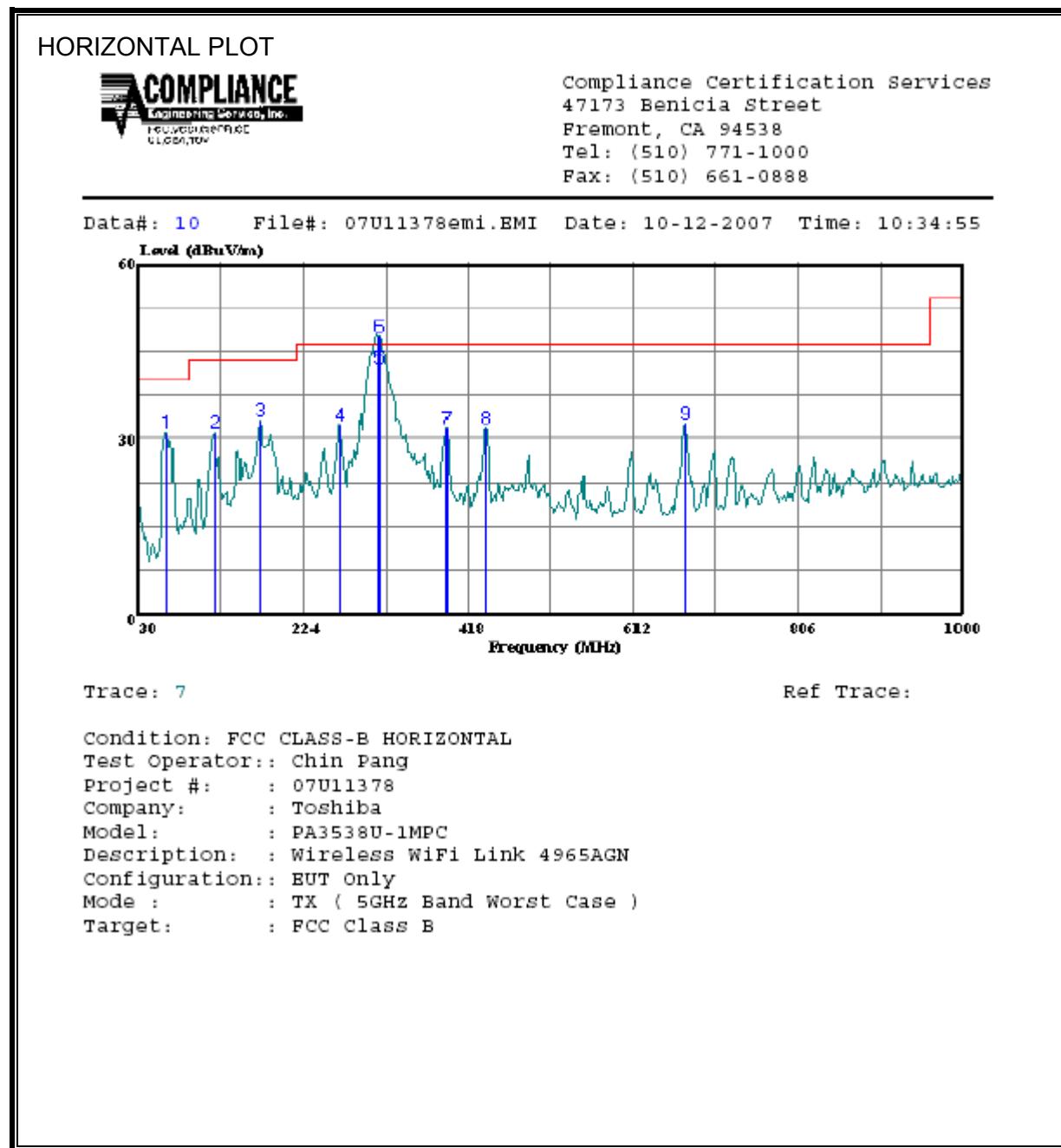
## 7.1.6. RECEIVER ABOVE 1 GHz

## RECEIVER SPURIOUS EMISSIONS FOR 5150 TO 5350 MHz BAND

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company: Toshiba Project #: 07U11378 Date: 10/15/2007 Test Engineer: Chin Pang Configuration: EUT/Laptop Mode: RX, 5.2GHz ( Worst Case )																	
<u>Test Equipment:</u>																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 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			Peak Measurements RBW=VBW=1MHz		
															Average Measurements RBW=1MHz ; VBW=10Hz		
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF	CL	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																	
1.333	3.0	60.0	43.6	25.0	3.4	-39.0	0.0	0.0	49.4	33.0	74	54	-24.6	-21.0	V		
1.596	3.0	53.7	39.6	26.0	3.8	-38.6	0.0	0.0	44.8	30.7	74	54	-29.2	-23.3	V		
1.658	3.0	55.2	40.4	26.2	3.9	-38.6	0.0	0.0	46.7	31.9	74	54	-27.3	-22.1	V		
1.331	3.0	57.5	45.3	25.0	3.4	-39.0	0.0	0.0	46.9	34.7	74	54	-27.1	-19.3	H		
1.598	3.0	55.1	39.7	26.0	3.8	-38.6	0.0	0.0	46.2	30.8	74	54	-27.8	-23.2	H		
1.665	3.0	57.8	42.4	26.2	3.9	-38.5	0.0	0.0	49.3	33.9	74	54	-24.7	-20.1	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 DATA

Page: 1

	Freq	Read Level	Over Level	Limit	Remark
	MHz	dBuV	dBuV/m	dB	
1	62.980	53.81	30.84	-9.16	Peak
2	119.240	47.66	30.81	-12.69	Peak
3	172.590	51.27	33.04	-10.46	Peak
4	266.680	49.50	32.34	-13.66	Peak
5	313.240	57.60	41.98	-4.02	QP
6 *	313.240	63.12	47.50	1.50	Peak
7	392.780	45.14	31.58	-14.42	Peak
8	439.340	44.16	31.66	-14.34	Peak
9	672.140	41.30	32.34	-13.66	Peak

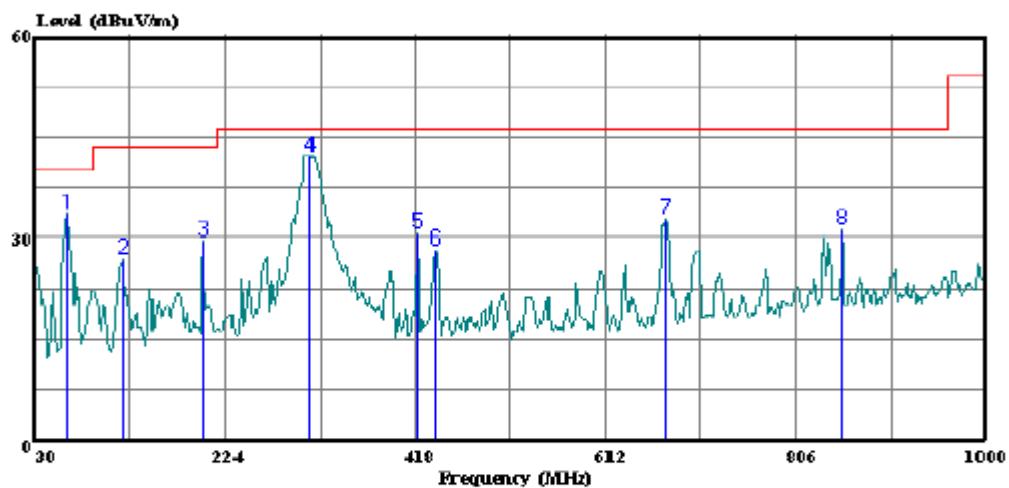
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

**VERTICAL PLOT**



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

Data#: 12 File#: 07U11378emi.EMI Date: 10-12-2007 Time: 10:45:37



Trace: 11

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Test Operator:: Chin Pang  
Project #: : 07U11378  
Company: : Toshiba  
Model: : PA3538U-1MPC  
Description: : Wireless WiFi Link 4965AGN  
Configuration:: EUT Only  
Mode : : TX ( 5GHz Band Worst Case )  
Target: : FCC Class B

**VERTICAL DATA**

Freq	MHz	Read	Over	Page: 1	
		Level	Level	Limit	Remark
		dBuV	dBuV/m	dB	
1	62.980	56.59	33.62	-6.38	Peak
2	119.240	43.80	26.95	-16.55	Peak
3	201.690	46.73	29.54	-13.96	Peak
4	310.330	57.77	42.17	-3.83	Peak
5	419.940	43.65	30.67	-15.33	Peak
6	439.340	40.75	28.25	-17.75	Peak
7	674.080	41.73	32.85	-13.15	Peak
8	853.530	37.07	31.27	-14.73	Peak