



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 7  
CLASS II PERMISSIVE CHANGE**

**CERTIFICATION TEST REPORT**

**FOR**

**Intel Wi-Fi Link 5100 Series**

**MODEL NUMBER: PA3655U-1MPC**

**FCC ID: CJ6UPA3655WL  
IC: 248H-DPA3655W**

**REPORT NUMBER: 08U12001-1**

**ISSUE DATE: AUGUST 25, 2008**

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	08/25/08	Initial Issue	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:** Intel Wi-Fi Link 5100 Series

**MODEL:** PA3655U-1MPC

**SERIAL NUMBER:** 3C4823509040

**DATE TESTED:** AUGUST 6 – 25, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

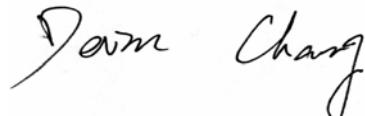
Approved & Released For CCS By:



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THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



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DEVIN CHANG  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

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

## 3. FACILITIES AND ACCREDITATION

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

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

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n transceiver Intel Wi-Fi Link 5100 Series

The radio module is manufactured by Intel.

### 5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major changes filed under this application are:

Change #1: Adding Portege M750 Tablet.

Change #2: Adding co-location with BT module FCC ID: RYYEYTFXCS.

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PFA antenna, with maximum gain of -0.55 dBi from 2400 - 2483.5 MHz, -1.06 dBi from 5150 - 5350 MHz, 2.11 dBi from 5470 - 5725 MHz, and 2.11 dBi from 5725 - 5850 MHz.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Intel® WiFi Link 5100-xVT

The test utility software used during testing was CRTU, rev. 5.0.69.0.

### 5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

The worst-position was the EUT with highest emissions. To determine the worst-case, the EUT was investigated for X, Y, Z, and mobile Positions, after the investigations, the worst-position were turned out to be a mobile position for all bands.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	TOSHIBA	PORTEGE M750	78033440H	DoC
AC Adaptor	TOSHIBA	PA3282U-5ACA	G71C0006Q310	DoC

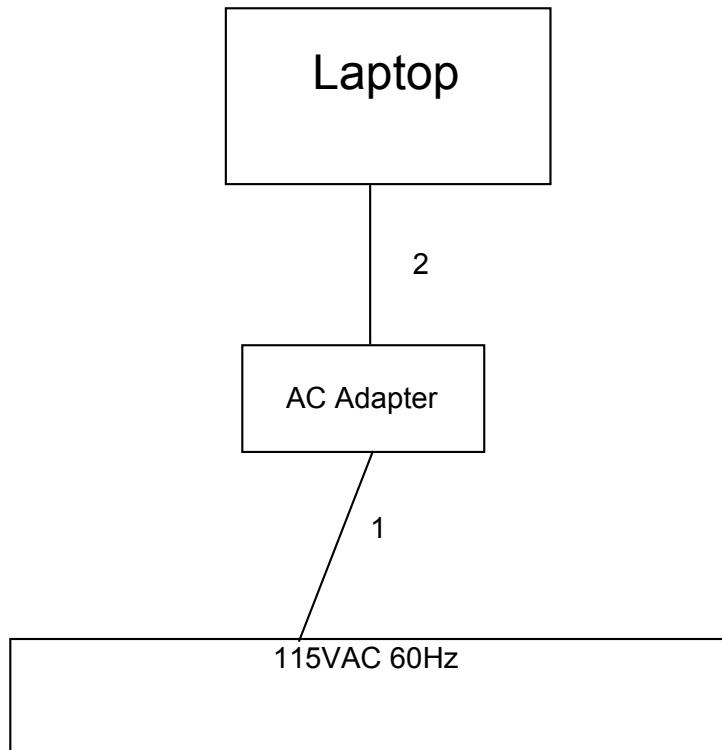
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	1.7m	NA
2	DC	1	DC	Un-shielded	1.7m	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	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	10/08/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/03/09
Antenna, Horn, 18 GHz	ETS	3117	C01005	04/22/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	09/28/08
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/09
2.4 GHz High Pass Filter	Micro Tronics	BRC13192	N02683	N/A
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	09/29/08
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/09
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/08
High Pass Filter 7.6GHz	Micro Tronics	HPM13195	N02681	CNR
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
LISN, 30 MHz	FCC	LISN-50/250-25-	N02625	10/25/08

## 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.

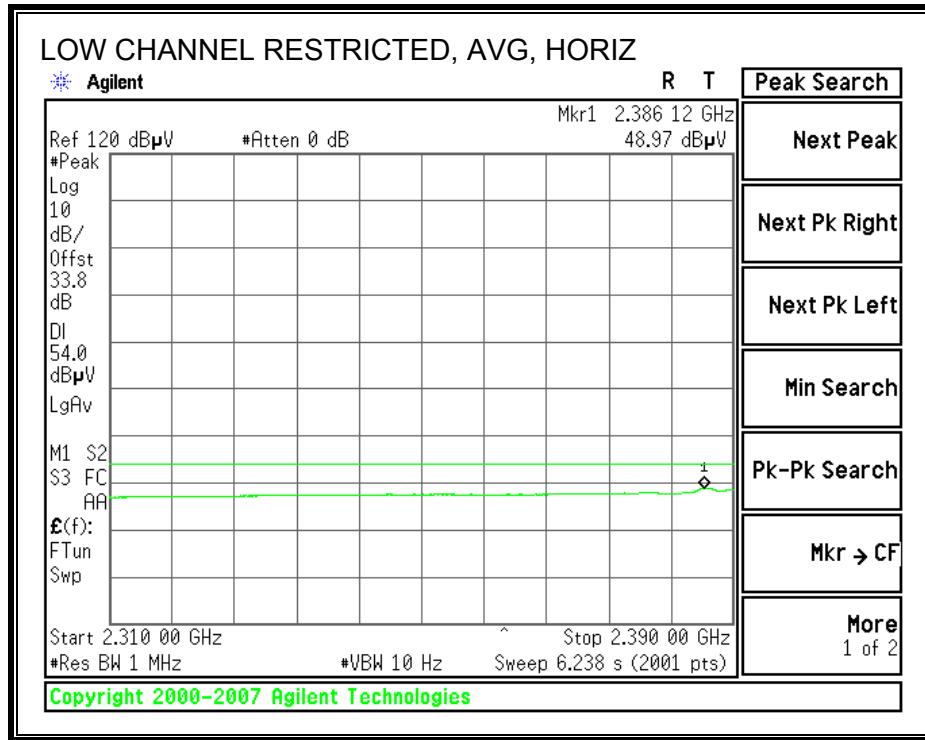
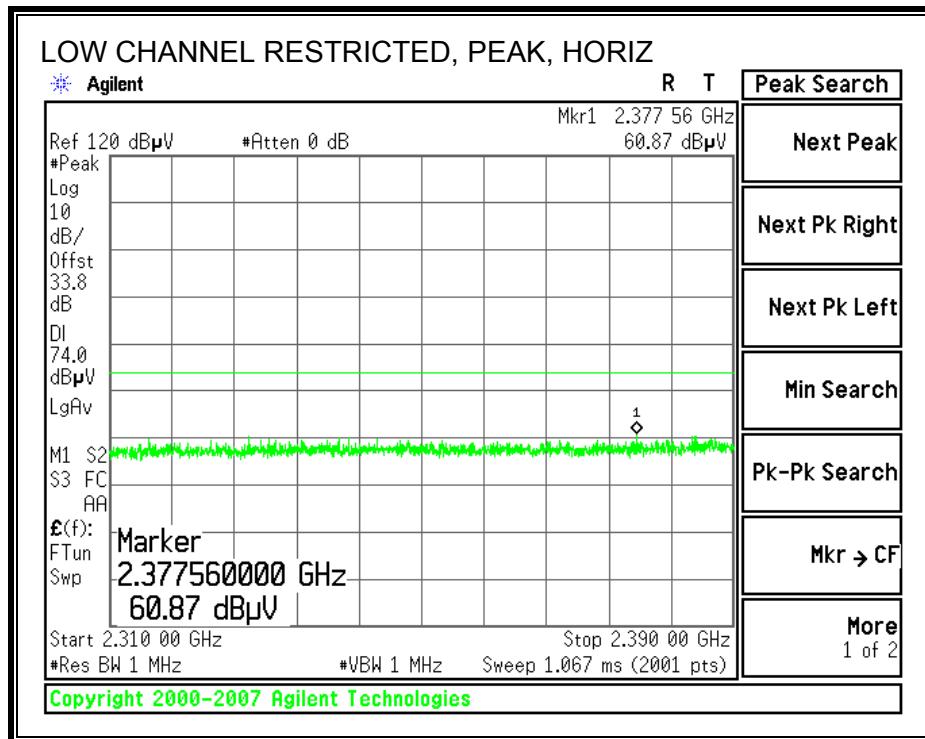
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

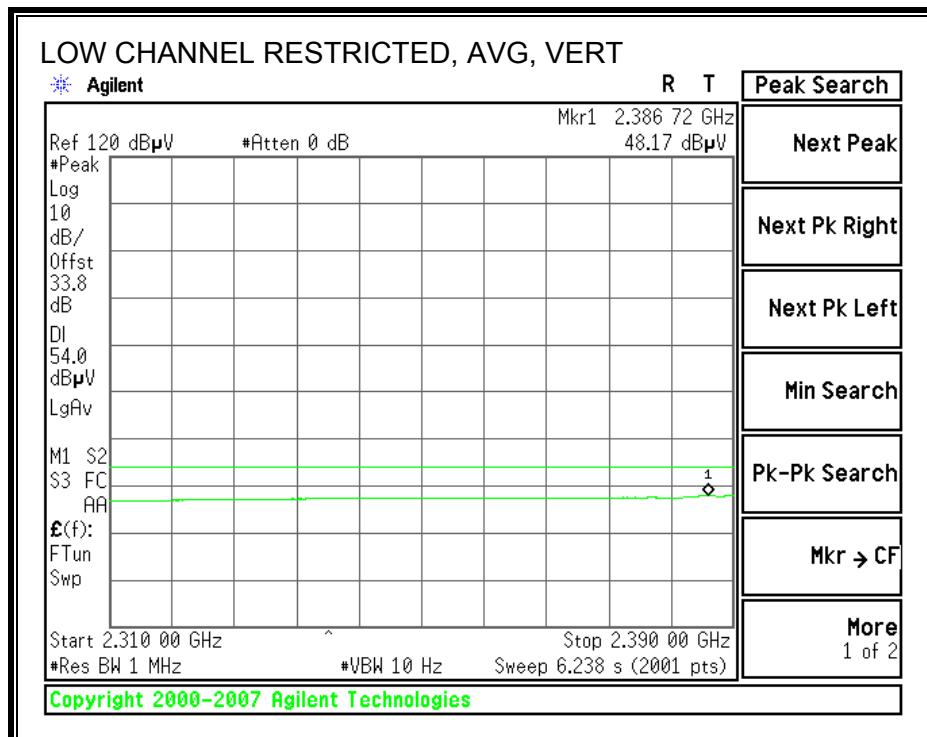
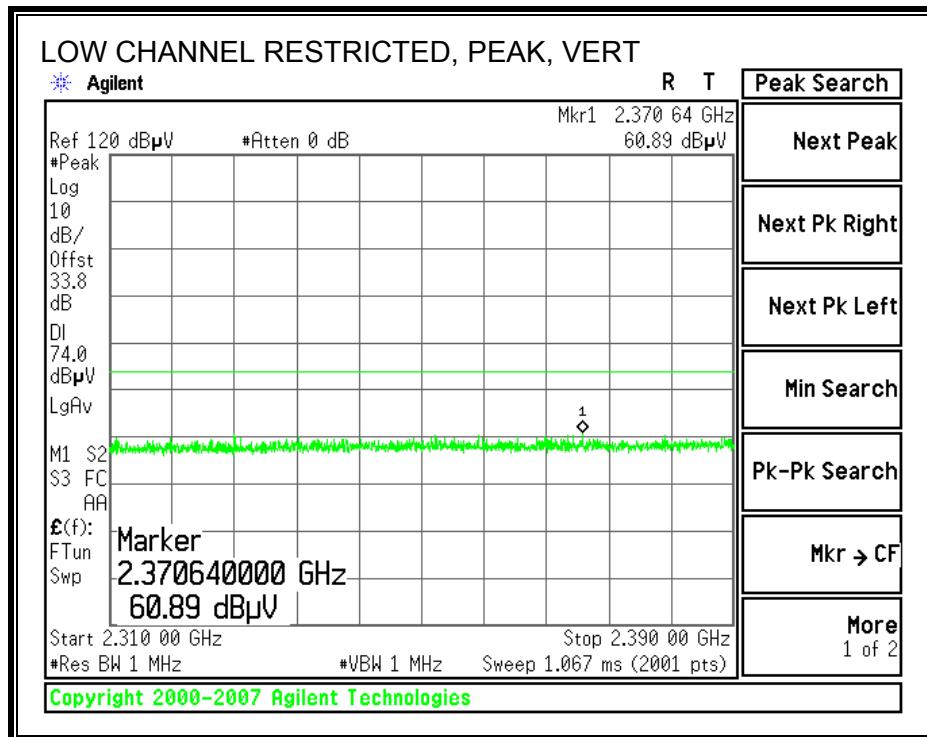
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 7.2. TRANSMITTER ABOVE 1 GHz IN THE 2.4 GHz BAND

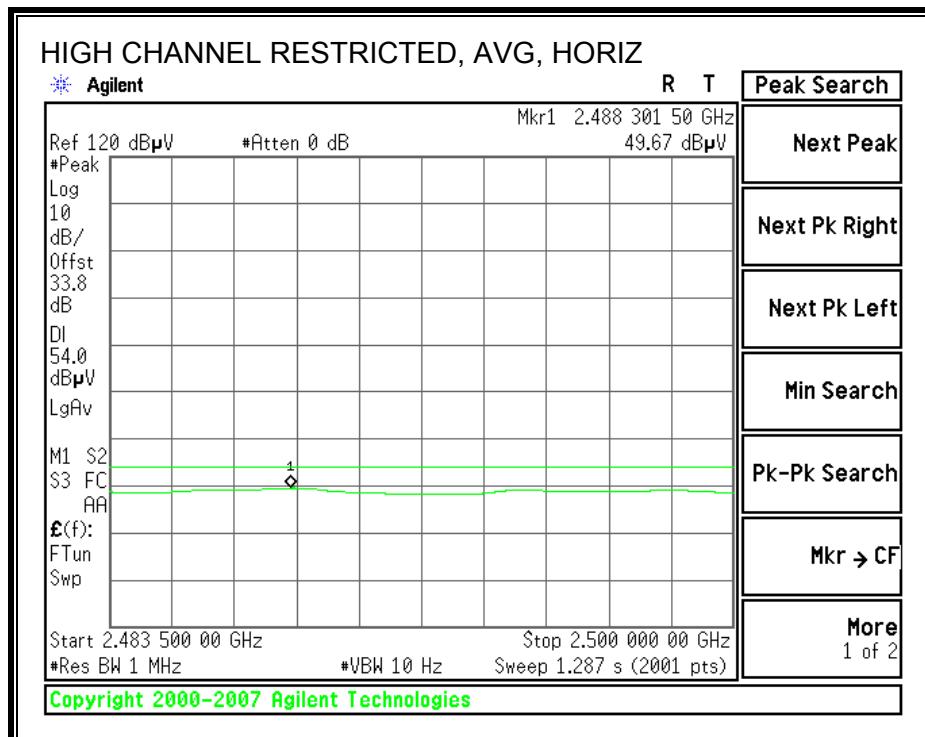
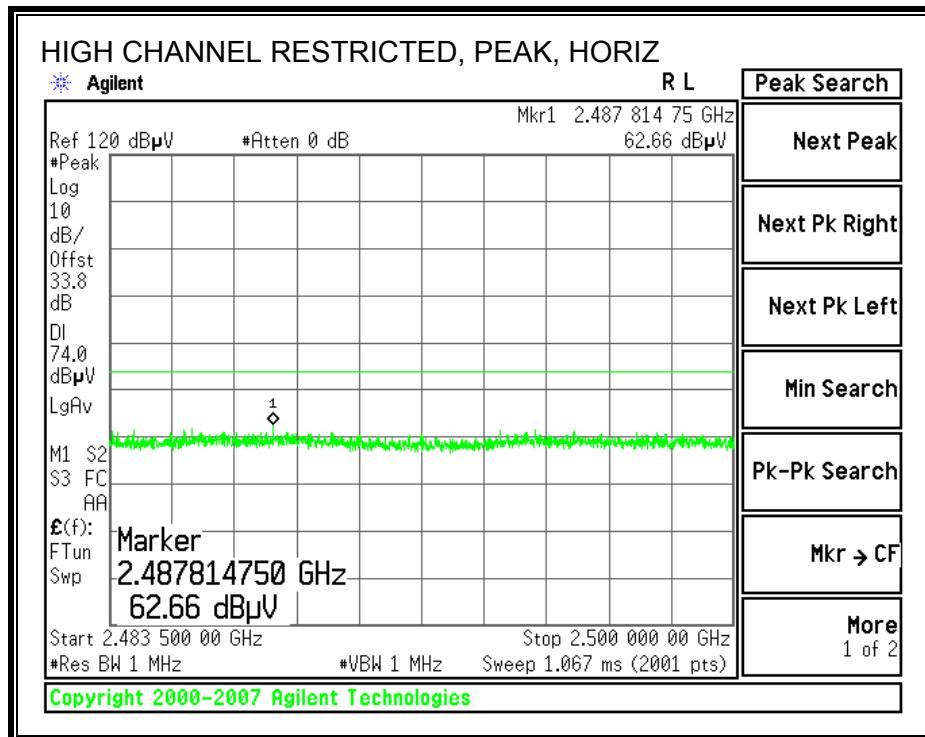
### 7.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b LEGACY MODE RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



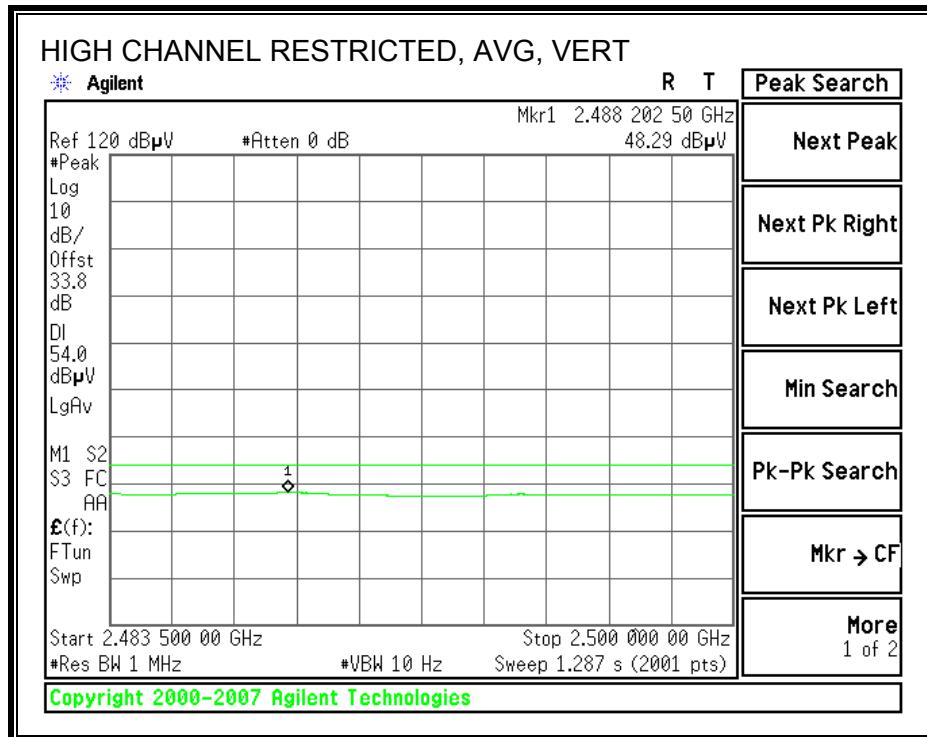
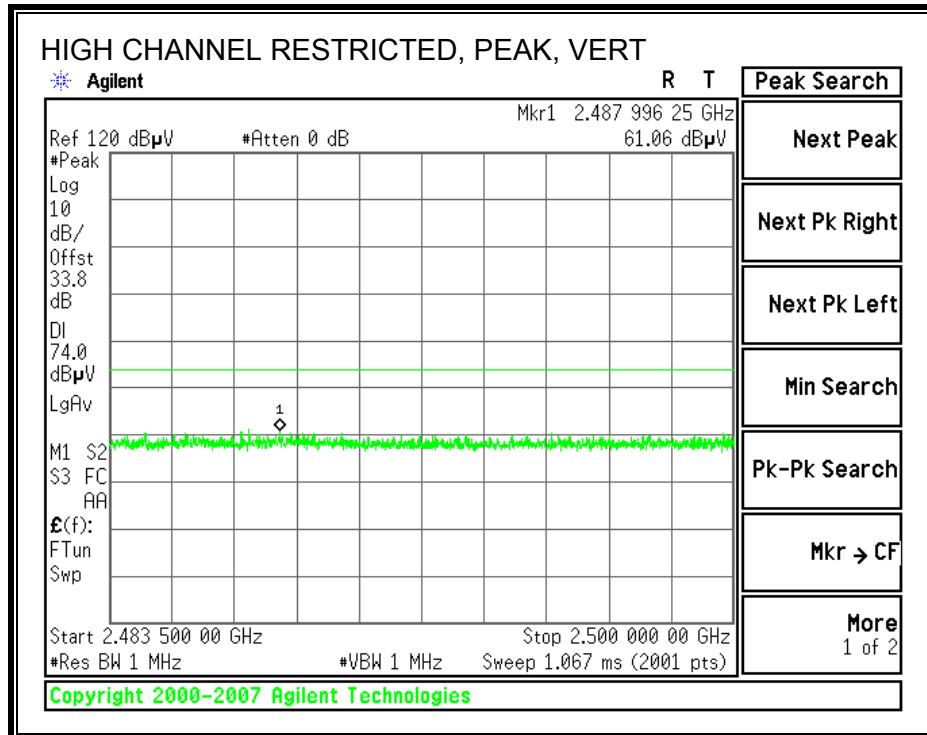
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



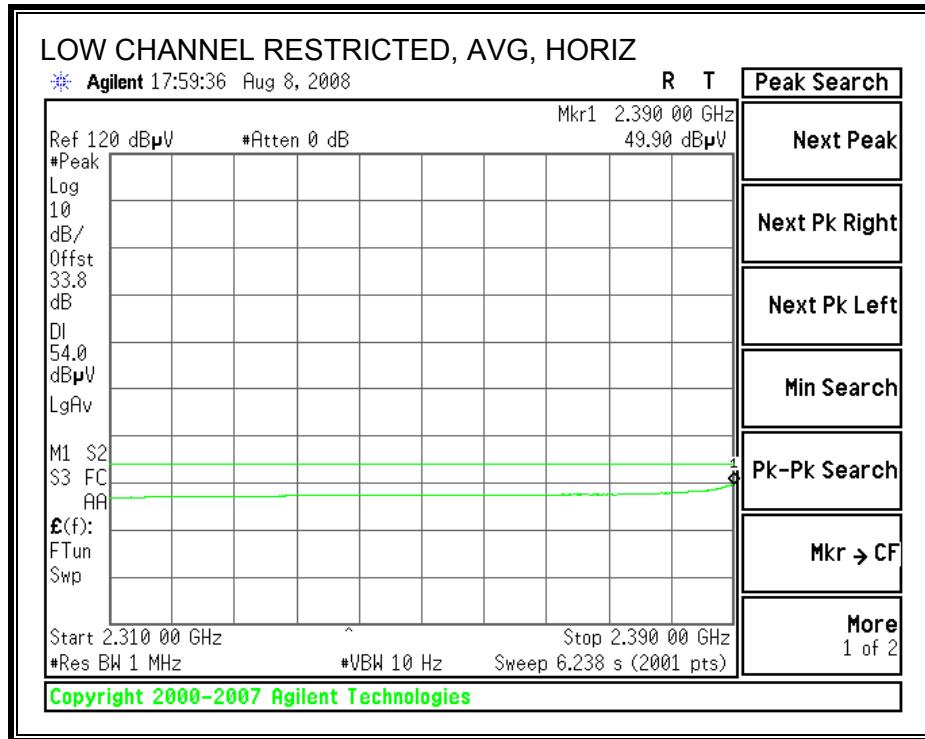
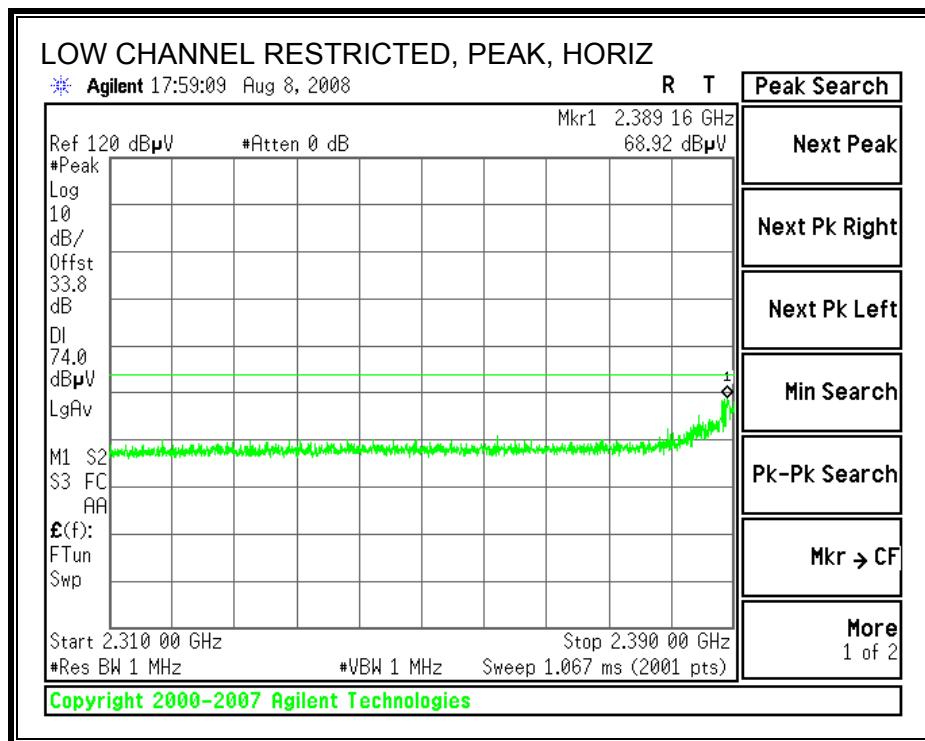
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



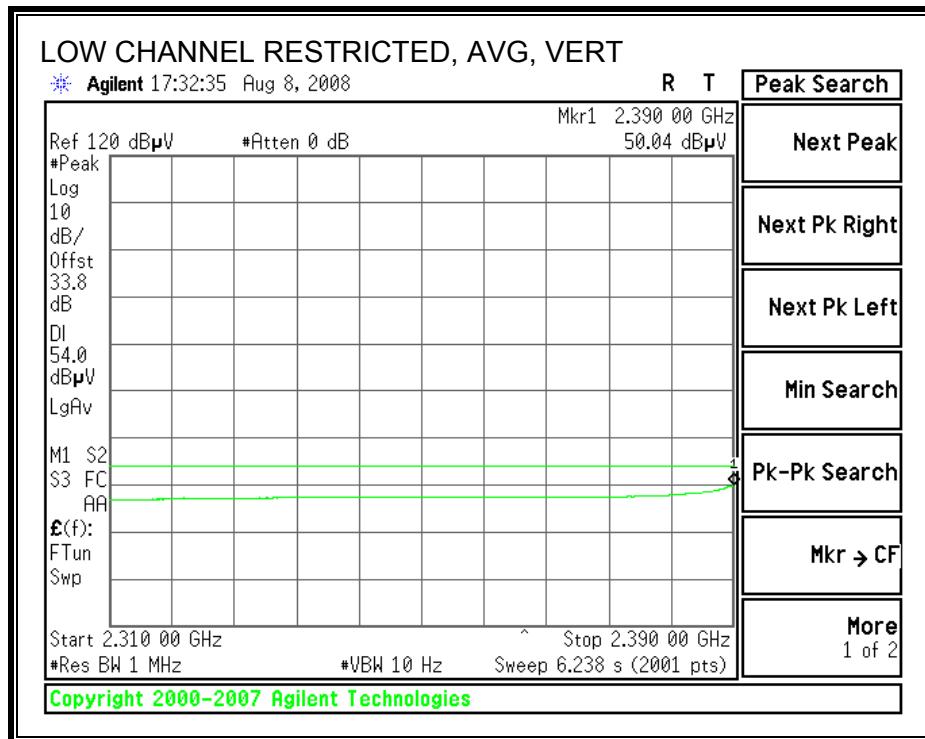
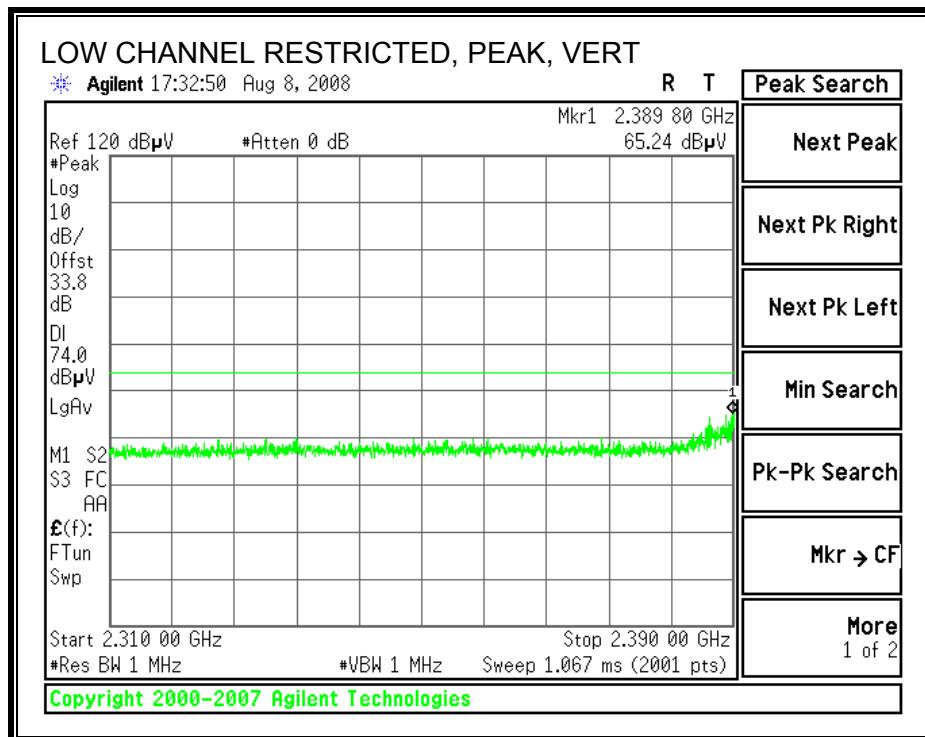
## HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																
<p>Company: INTEL Project #: 08U12001 Date: 8/23/2008 Test Engineer: Devin Chang Configuration: EUT only Mode: Tx, 2.4GHz b mode</p> <p>Test Equipment:</p> <table border="1"> <tr> <td>Horn 1-18GHz</td> <td>Pre-amplifier 1-26GHz</td> <td>Pre-amplifier 26-40GHz</td> <td colspan="3">Horn &gt; 18GHz</td> </tr> <tr> <td>T60; S/N: 2238 @3m</td> <td>T144 Miteq 3008A00931</td> <td></td> <td colspan="3">T125; ARA 18-26GHz; S/N:1007</td> </tr> <tr> <td colspan="6">Hi Frequency Cables</td> </tr> <tr> <td>2 foot cable</td> <td>3 foot cable</td> <td>12 foot cable</td> <td colspan="3">HPF</td> <td>Reject Filter</td> <td colspan="8">Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz</td> </tr> <tr> <td></td> <td></td> <td>B-5m Chamber</td> <td></td> <td></td> <td></td> <td>R_001</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>																Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz			T60; S/N: 2238 @3m	T144 Miteq 3008A00931		T125; ARA 18-26GHz; S/N:1007			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										B-5m Chamber				R_001									
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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. 2412MHz</b>																																																																
4.824	3.0	44.3	32.8	33.0	7.1	-36.5	0.0	0.0	48.0	36.5	74	54	-26.0	-17.5	V																																																	
4.824	3.0	44.9	37.6	33.0	7.1	-36.5	0.0	0.0	48.5	41.2	74	54	-25.5	-12.8	H																																																	
<b>Mid Ch. 2437MHz</b>																																																																
4.874	3.0	42.1	30.9	33.1	7.2	-36.5	0.0	0.0	45.8	34.6	74	54	-28.2	-19.4	V																																																	
4.874	3.0	43.5	33.6	33.1	7.2	-36.5	0.0	0.0	47.2	37.3	74	54	-26.8	-16.7	H																																																	
<b>High Ch. 2462MHz</b>																																																																
4.924	3.0	42.4	31.6	33.1	7.2	-36.5	0.0	0.0	46.2	35.4	74	54	-27.8	-18.6	V																																																	
4.924	3.0	44.1	35.5	33.1	7.2	-36.5	0.0	0.0	47.9	39.3	74	54	-26.1	-14.7	H																																																	
No more signal found																																																																
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																																																												

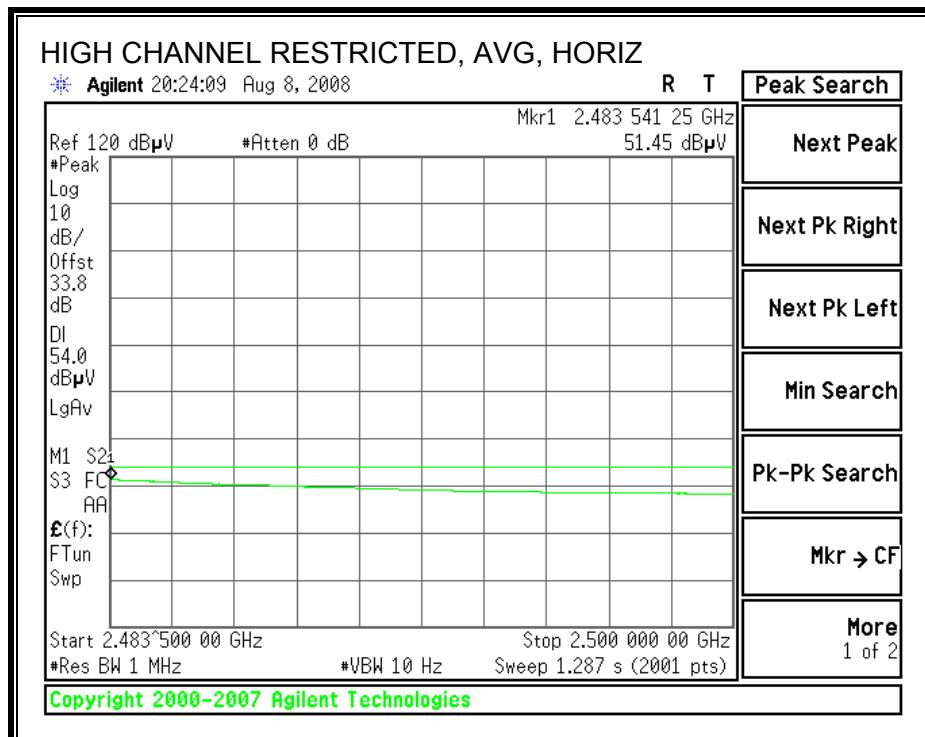
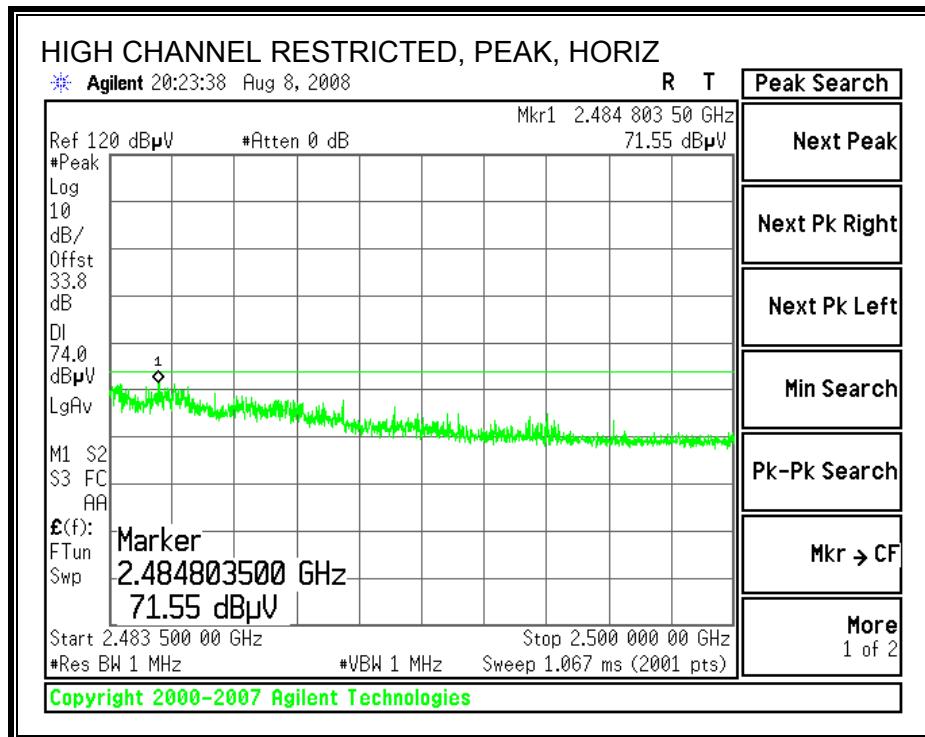
**7.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g LEGACY MODE**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



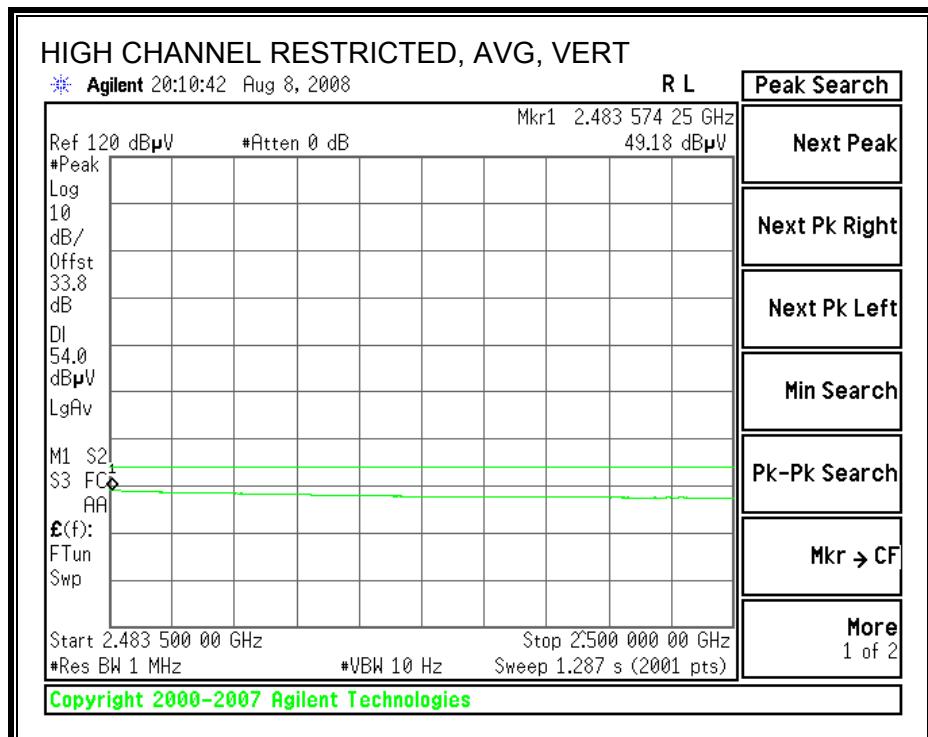
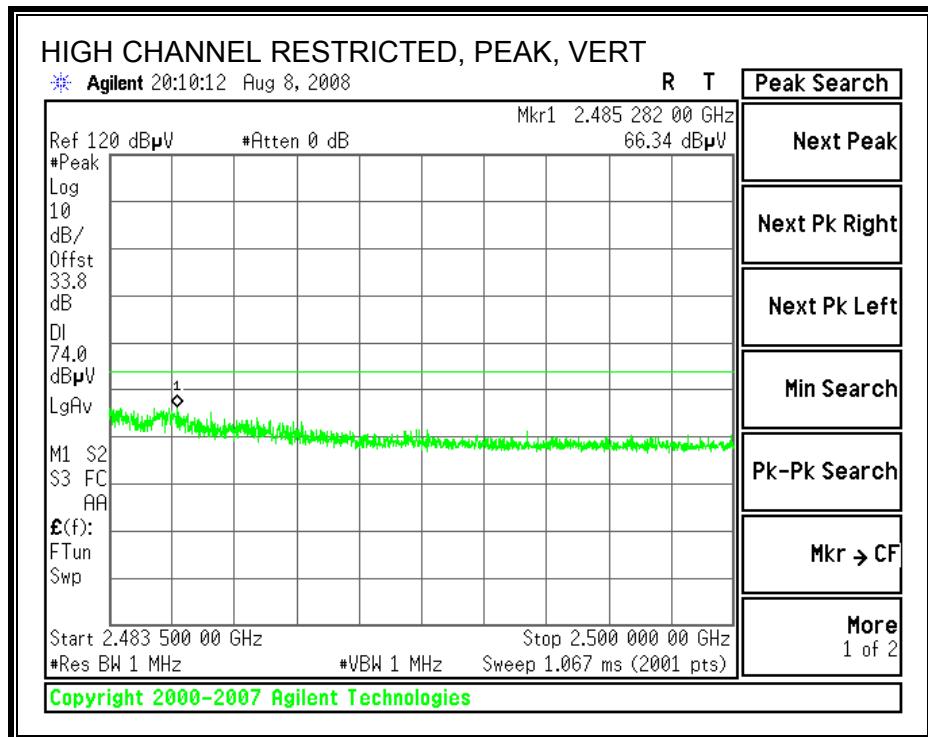
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



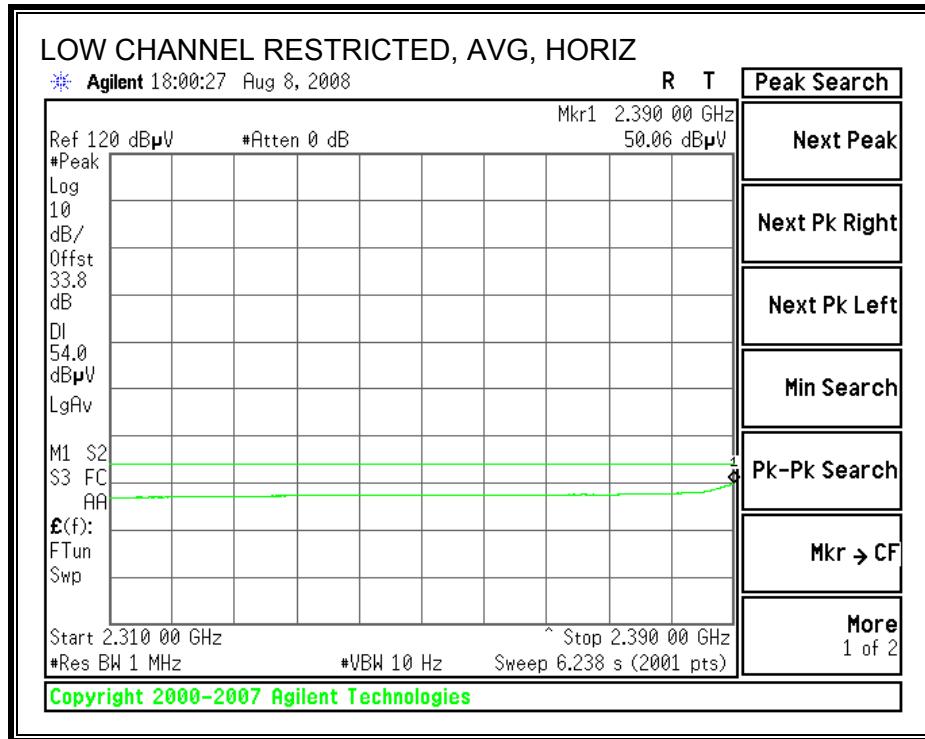
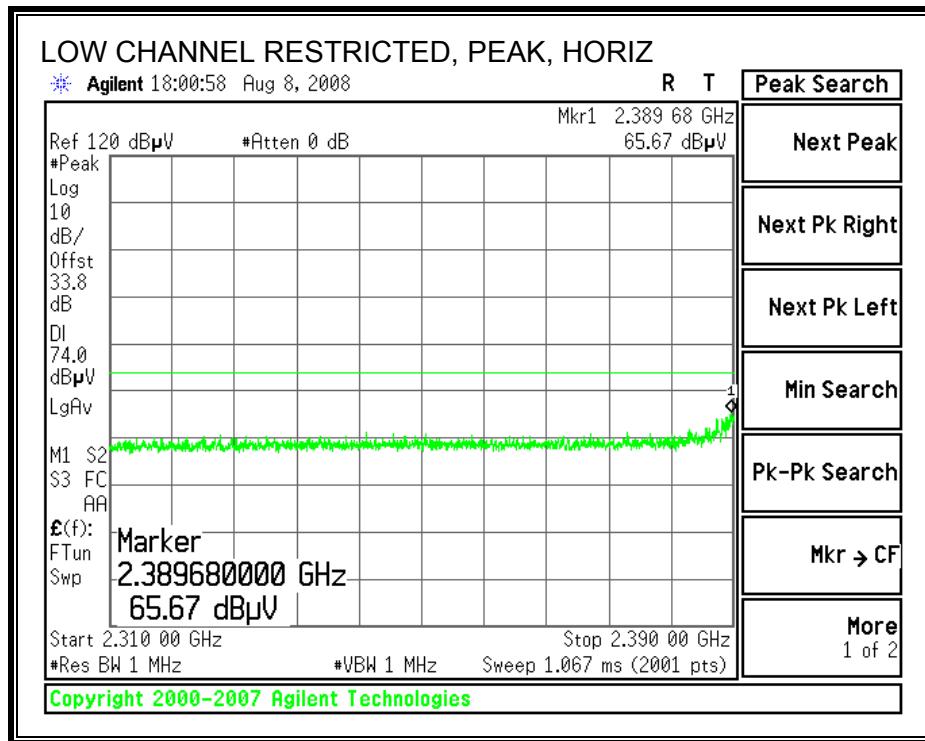
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



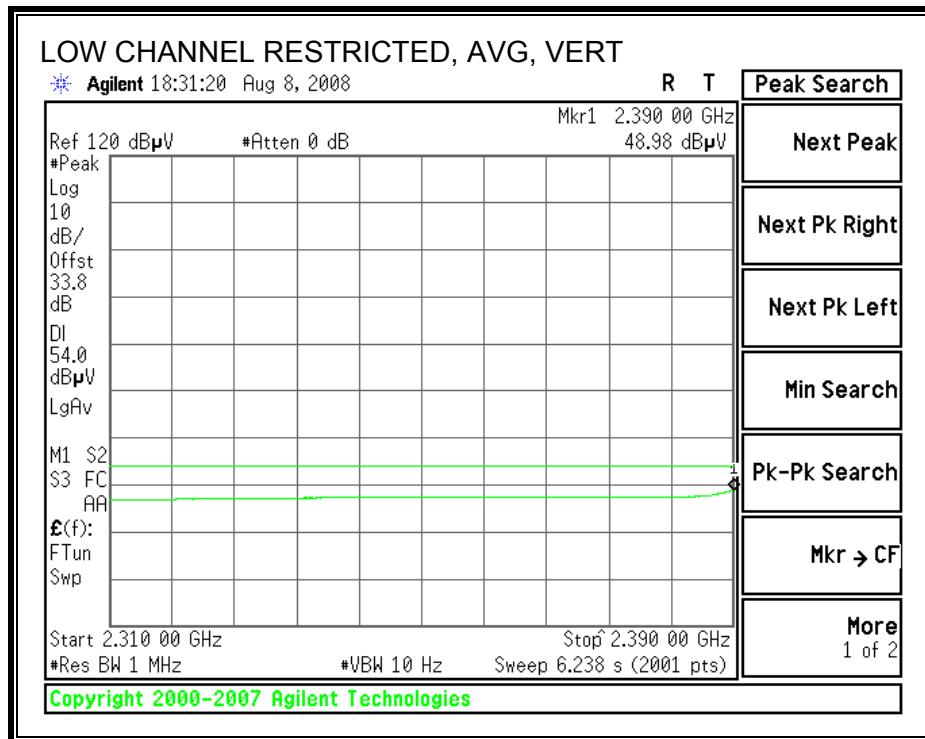
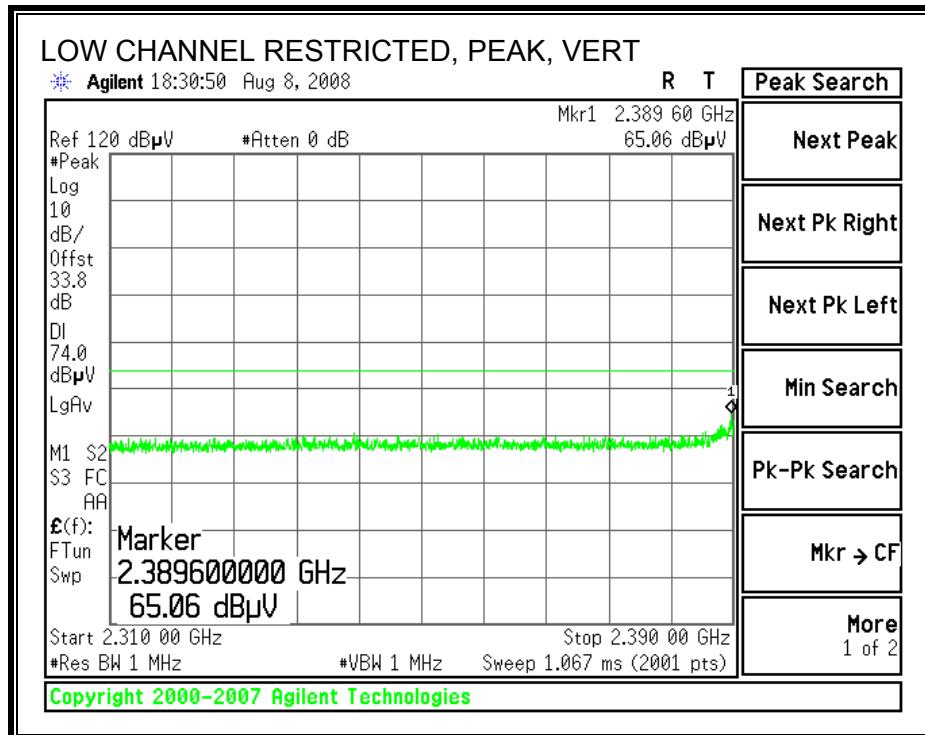
## HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																																																																																								
<p>Company: INTEL Project #: 08U12001 Date: 8/7/2008 Test Engineer: Devin Chang Configuration: EUT only Mode: Tx, 2.4GHz g mode</p> <p>Test Equipment:</p> <table border="1"> <tr> <td>Horn 1-18GHz</td> <td>Pre-amplifier 1-26GHz</td> <td>Pre-amplifier 26-40GHz</td> <td>Horn &gt; 18GHz</td> </tr> <tr> <td>T60; S/N: 2238 @3m</td> <td>T144 Miteq 3008A00931</td> <td></td> <td>T125; ARA 18-26GHz; S/N:1007</td> </tr> <tr> <td colspan="4">Hi Frequency Cables</td> </tr> <tr> <td>2 foot cable</td> <td>3 foot cable</td> <td>12 foot cable</td> <td>HPF</td> <td>Reject Filter</td> <td colspan="9"> <p><u>Peak Measurements</u> RBW=VBW=1MHz <u>Average Measurements</u> RBW=1MHz ; VBW=10Hz</p> </td> </tr> <tr> <td>f GHz</td> <td>Dist (m)</td> <td>Read Pk dBuV</td> <td>Read Avg. dBuV</td> <td>AF dB/m</td> <td>CL dB</td> <td>Amp dB</td> <td>D Corr dB</td> <td>Fltr dB</td> <td>Peak dBuV/m</td> <td>Avg dBuV/m</td> <td>Pk Lim dBuV/m</td> <td>Avg Lim dBuV/m</td> <td>Pk Mar dB</td> <td>Avg Mar dB</td> <td>Notes (V/H)</td> </tr> </table> <p><b>Low Ch. 2412MHz</b></p> <table border="1"> <tr> <td>4.824</td> <td>3.0</td> <td>43.1</td> <td>34.5</td> <td>33.0</td> <td>7.1</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>46.8</td> <td>38.2</td> <td>74</td> <td>54</td> <td>-27.2</td> <td>-15.8</td> <td>V</td> </tr> <tr> <td>4.824</td> <td>3.0</td> <td>41.4</td> <td>28.3</td> <td>33.0</td> <td>7.1</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>45.0</td> <td>32.0</td> <td>74</td> <td>54</td> <td>-29.0</td> <td>-22.0</td> <td>H</td> </tr> </table> <p><b>Mid Ch. 2437MHz</b></p> <table border="1"> <tr> <td>4.874</td> <td>3.0</td> <td>41.2</td> <td>29.2</td> <td>33.1</td> <td>7.2</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>44.9</td> <td>33.0</td> <td>74</td> <td>54</td> <td>-29.1</td> <td>-21.0</td> <td>V</td> </tr> <tr> <td>4.874</td> <td>3.0</td> <td>40.6</td> <td>32.1</td> <td>33.1</td> <td>7.2</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>44.3</td> <td>35.8</td> <td>74</td> <td>54</td> <td>-29.7</td> <td>-18.2</td> <td>H</td> </tr> </table> <p><b>High Ch. 2462MHz</b></p> <table border="1"> <tr> <td>4.924</td> <td>3.0</td> <td>40.4</td> <td>30.0</td> <td>33.1</td> <td>7.2</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>44.2</td> <td>33.8</td> <td>74</td> <td>54</td> <td>-29.8</td> <td>-20.2</td> <td>V</td> </tr> <tr> <td>4.924</td> <td>3.0</td> <td>41.6</td> <td>34.1</td> <td>33.1</td> <td>7.2</td> <td>-36.5</td> <td>0.0</td> <td>0.0</td> <td>45.5</td> <td>38.0</td> <td>74</td> <td>54</td> <td>-28.5</td> <td>-16.0</td> <td>H</td> </tr> </table> <p>No more signal found</p> <p>Rev. 4.12.7</p> <p>     f Measurement Frequency      Dist Distance to Antenna      Read Analyzer Reading      AF Antenna Factor      CL Cable Loss   </p> <p>     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   </p> <p>     Avg Lim Average Field Strength Limit      Pk Lim Peak Field Strength Limit      Avg Mar Margin vs. Average Limit      Pk Mar Margin vs. Peak Limit   </p>															Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	T60; S/N: 2238 @3m	T144 Miteq 3008A00931		T125; ARA 18-26GHz; S/N:1007	Hi Frequency Cables				2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	<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)	4.824	3.0	43.1	34.5	33.0	7.1	-36.5	0.0	0.0	46.8	38.2	74	54	-27.2	-15.8	V	4.824	3.0	41.4	28.3	33.0	7.1	-36.5	0.0	0.0	45.0	32.0	74	54	-29.0	-22.0	H	4.874	3.0	41.2	29.2	33.1	7.2	-36.5	0.0	0.0	44.9	33.0	74	54	-29.1	-21.0	V	4.874	3.0	40.6	32.1	33.1	7.2	-36.5	0.0	0.0	44.3	35.8	74	54	-29.7	-18.2	H	4.924	3.0	40.4	30.0	33.1	7.2	-36.5	0.0	0.0	44.2	33.8	74	54	-29.8	-20.2	V	4.924	3.0	41.6	34.1	33.1	7.2	-36.5	0.0	0.0	45.5	38.0	74	54	-28.5	-16.0	H
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz																																																																																																																																																					
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4.824	3.0	43.1	34.5	33.0	7.1	-36.5	0.0	0.0	46.8	38.2	74	54	-27.2	-15.8	V																																																																																																																																									
4.824	3.0	41.4	28.3	33.0	7.1	-36.5	0.0	0.0	45.0	32.0	74	54	-29.0	-22.0	H																																																																																																																																									
4.874	3.0	41.2	29.2	33.1	7.2	-36.5	0.0	0.0	44.9	33.0	74	54	-29.1	-21.0	V																																																																																																																																									
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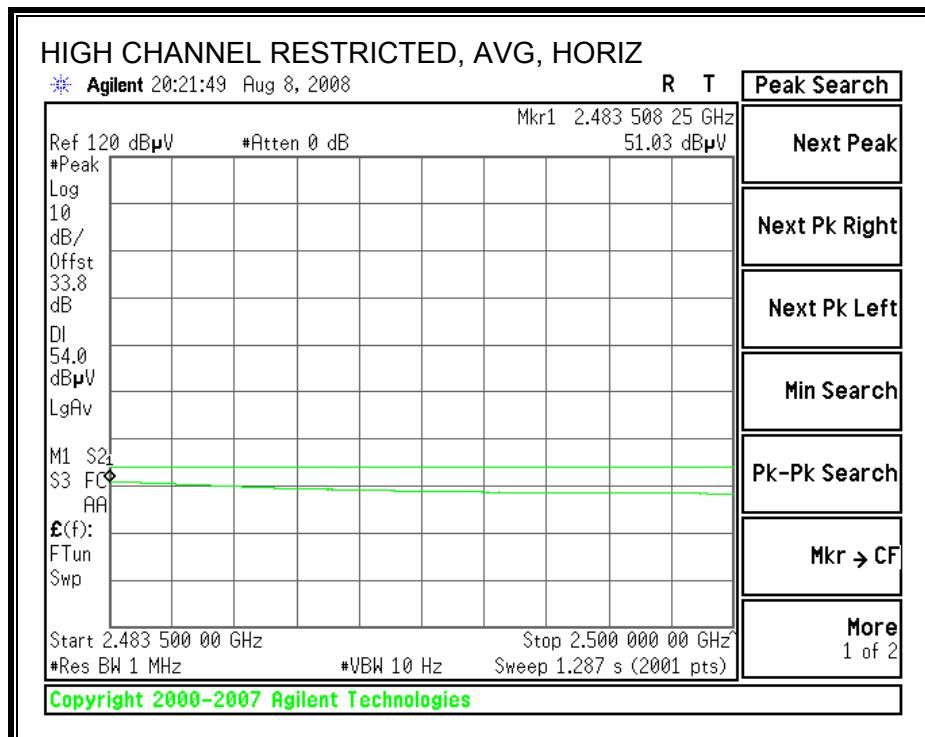
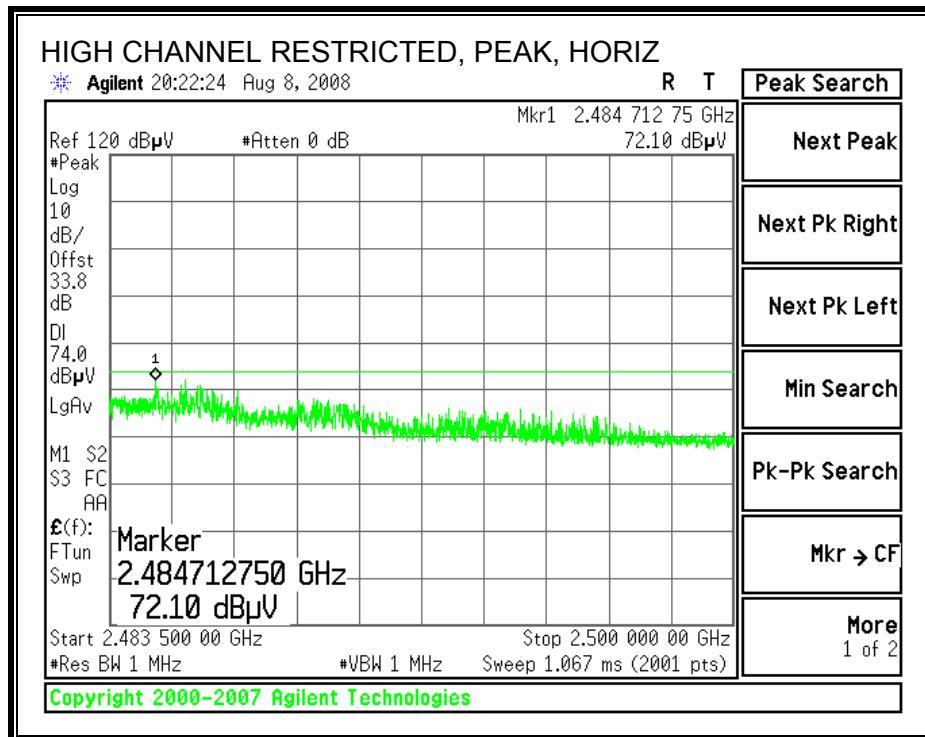
**7.2.3. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



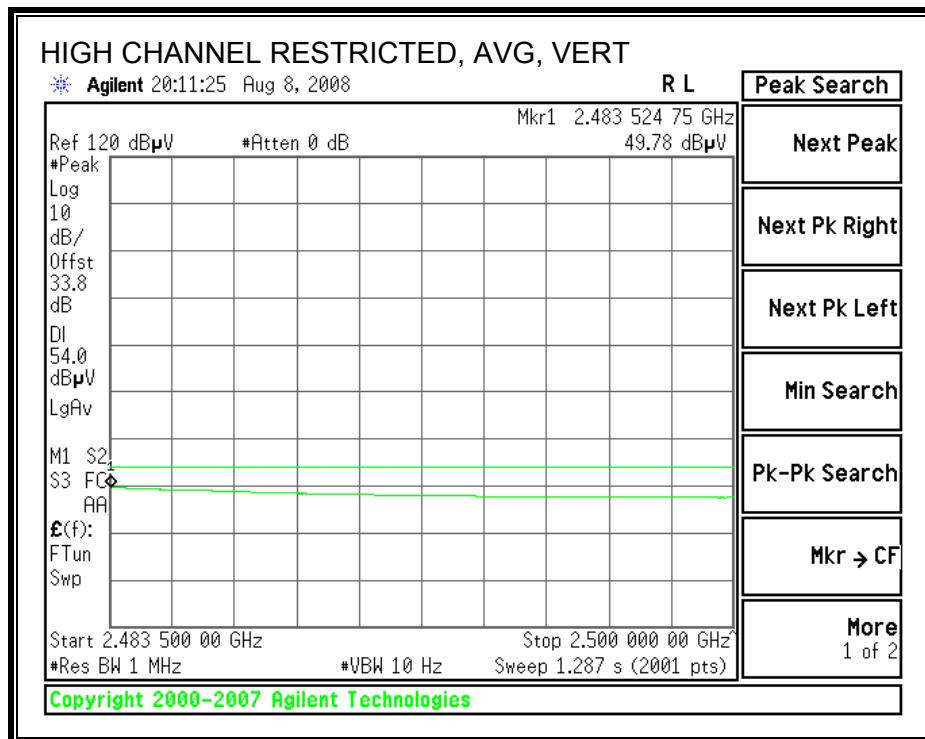
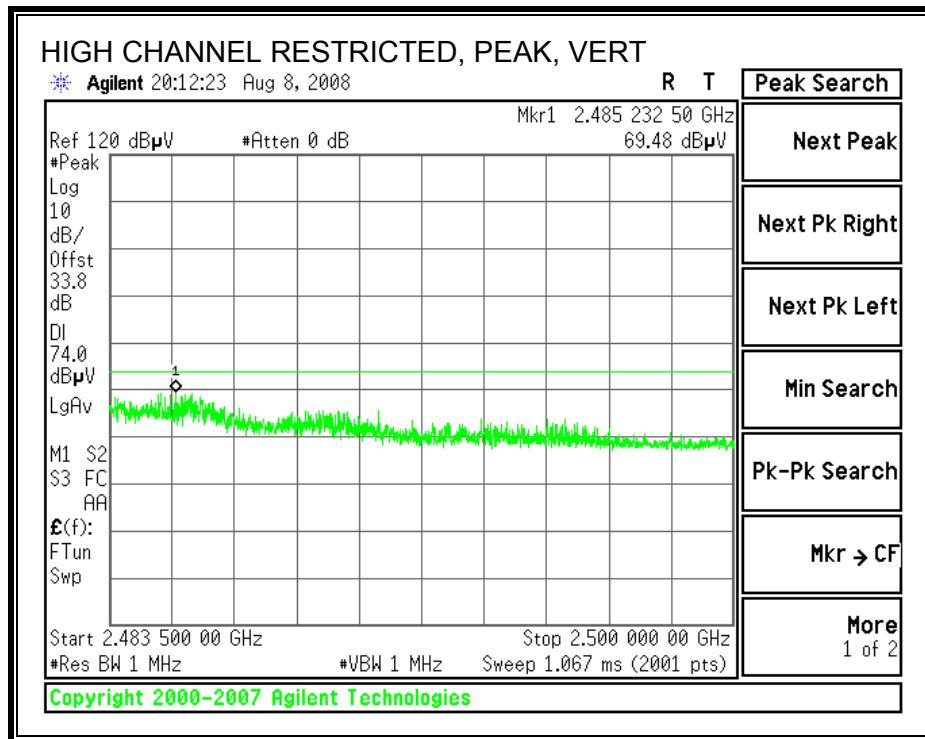
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



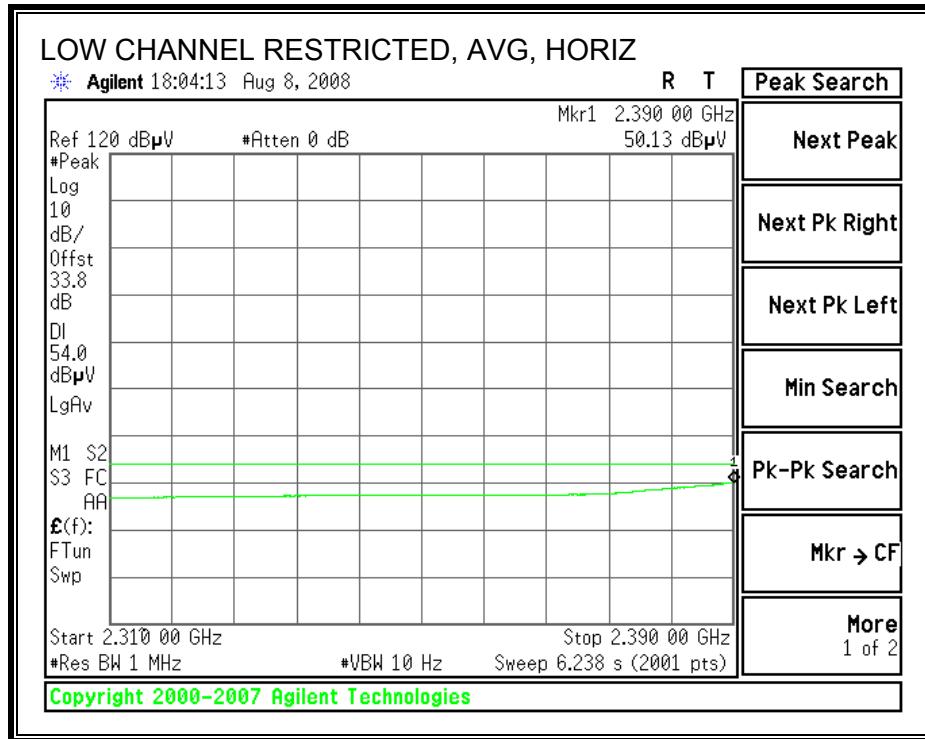
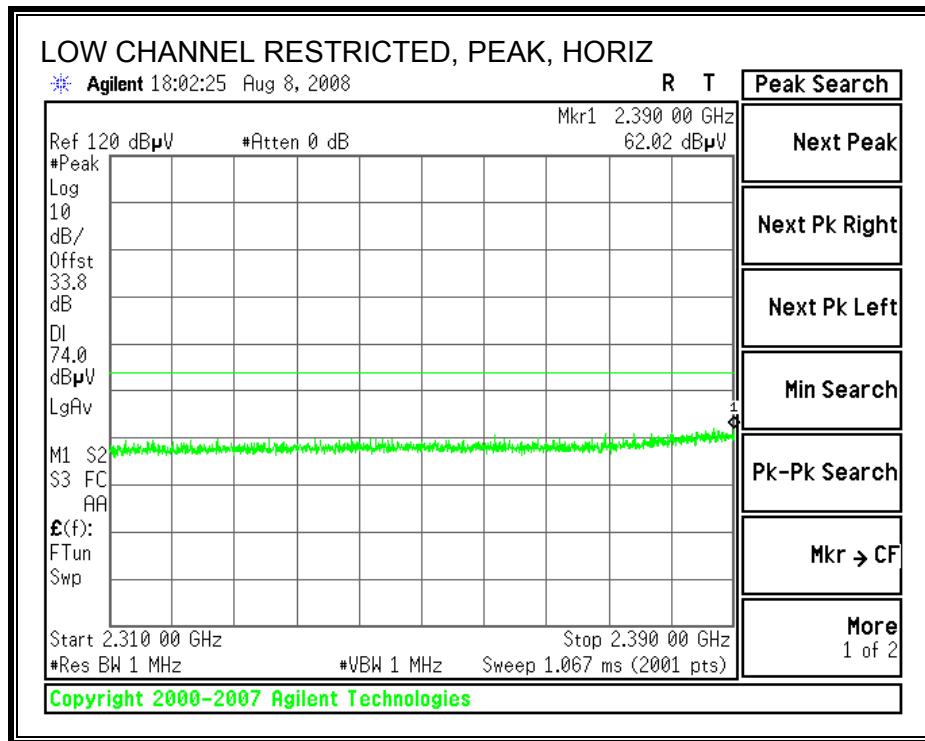
**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



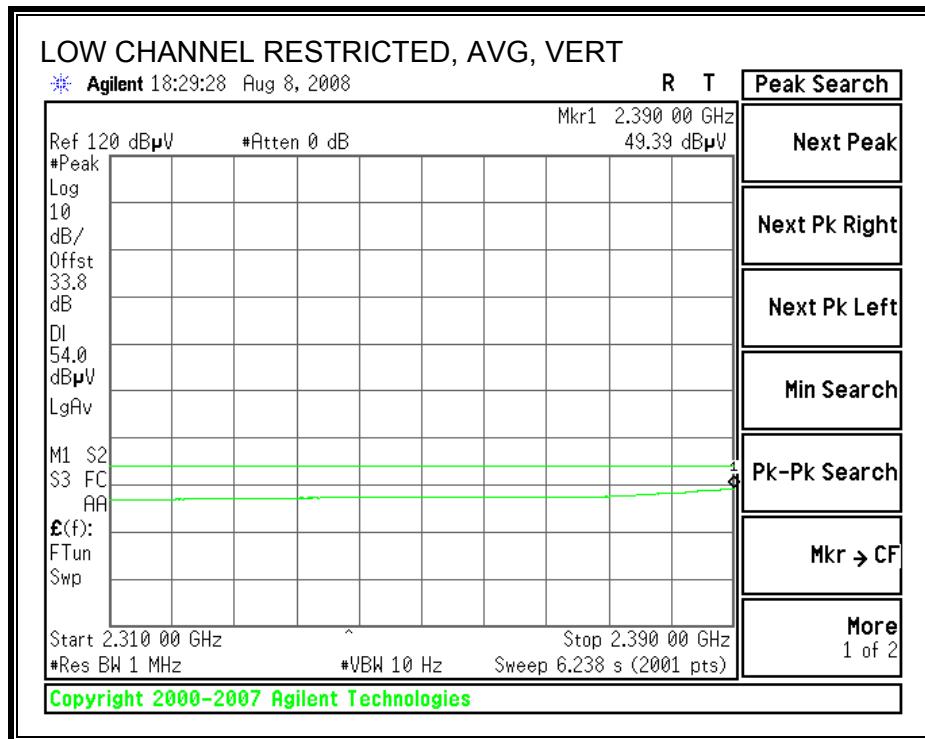
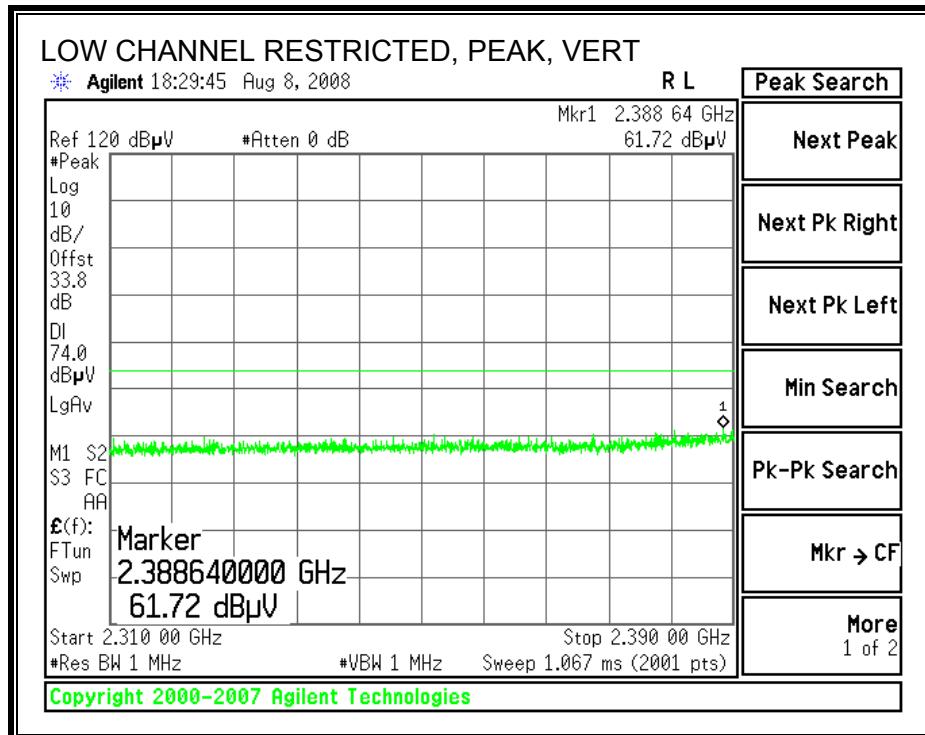
## HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: INTEL	Project #: 08U12001	Date: 8/7/2008	Test Engineer: Devin Chang	Configuration: EUT only	Mode: Tx, 2.4GHz HT20										
Test Equipment:															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz						
T60; S/N: 2238 @3m			T144 Miteq 3008A00931						T125; ARA 18-26GHz; S/N:1007						
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	
B-5m Chamber												R_001			
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. 2412MHz															
4.824	3.0	43.1	34.5	33.0	7.1	-36.5	0.0	0.0	46.8	38.2	74	54	-27.2	-15.8	V
4.824	3.0	43.1	31.1	33.0	7.1	-36.5	0.0	0.0	46.7	34.8	74	54	-27.3	-19.2	H
Mid Ch. 2437MHz															
4.874	3.0	40.1	29.3	33.1	7.2	-36.5	0.0	0.0	43.9	33.0	74	54	-30.1	-21.0	V
4.874	3.0	41.4	32.2	33.1	7.2	-36.5	0.0	0.0	45.2	35.9	74	54	-28.8	-18.1	H
High Ch. 2462MHz															
4.924	3.0	41.3	30.0	33.1	7.2	-36.5	0.0	0.0	45.1	33.8	74	54	-28.9	-20.2	V
4.924	3.0	42.1	34.0	33.1	7.2	-36.5	0.0	0.0	46.0	37.9	74	54	-28.0	-16.1	H
No more signal found															
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										

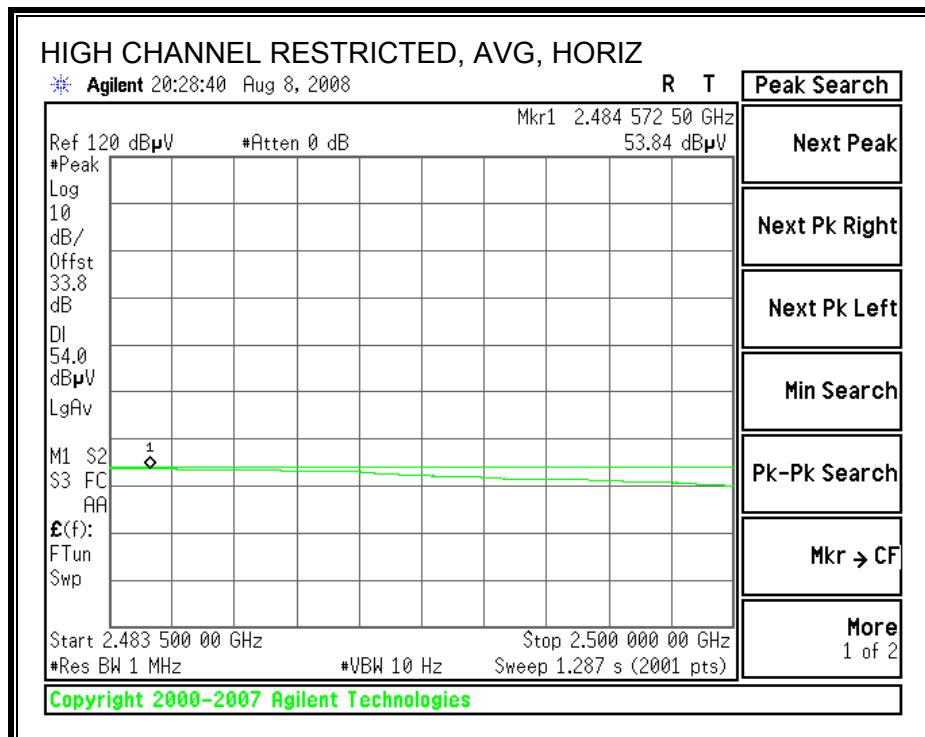
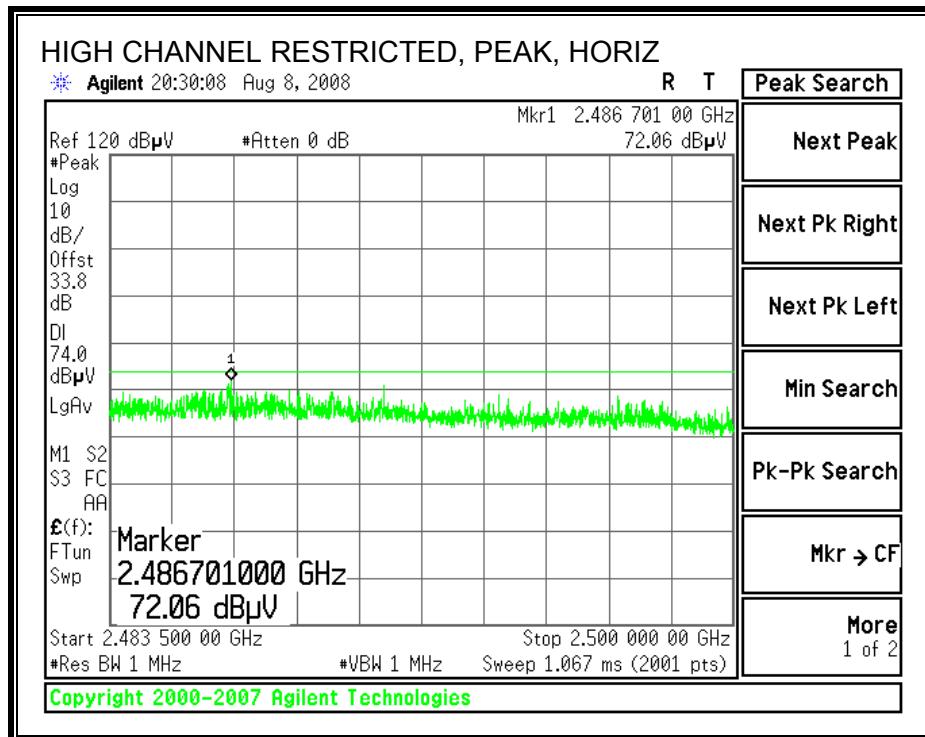
**7.2.4. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



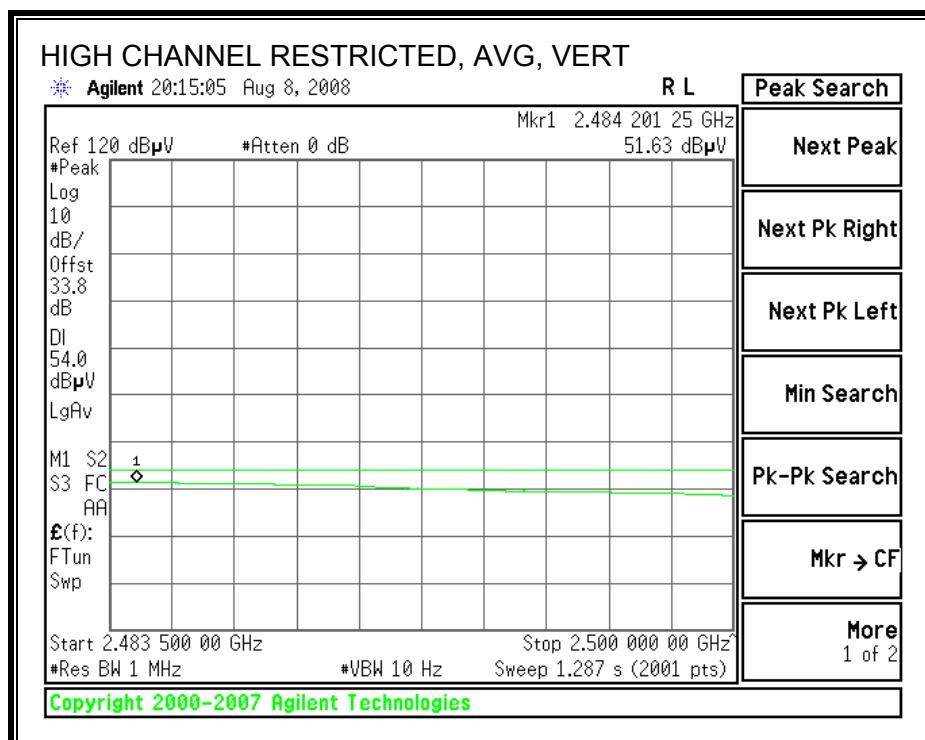
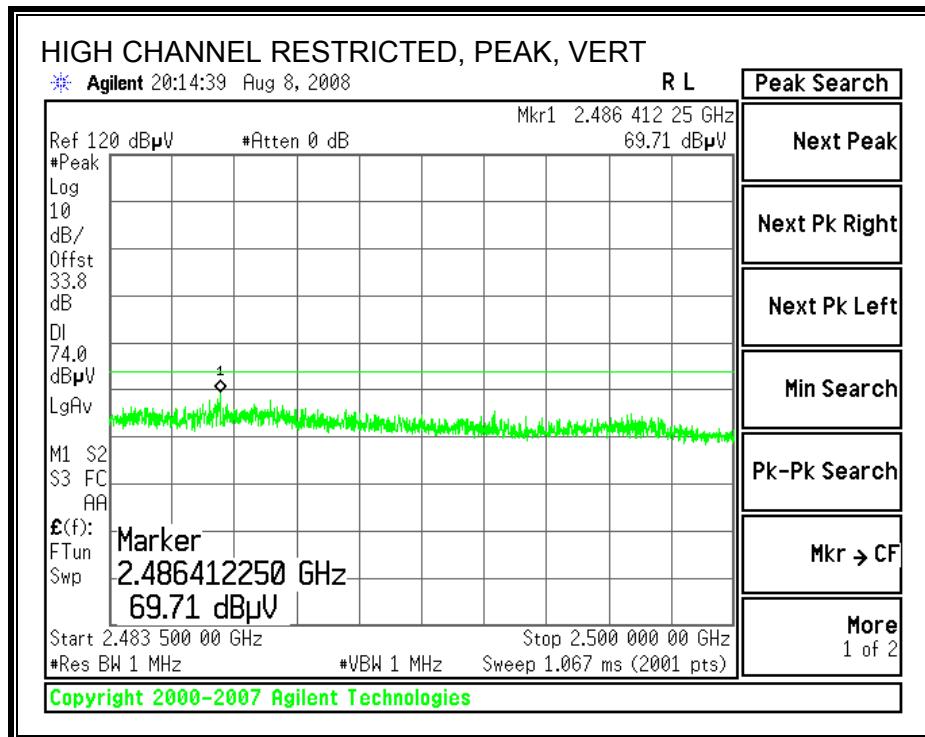
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**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: INTEL Project #: 08U12001 Date: 8/7/2008 Test Engineer: Devin Chang Configuration: EUT only Mode: Tx, 2.4GHz HT40</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>Horn &gt; 18GHz</td> </tr> <tr> <td>T60; S/N: 2238 @3m</td> <td>T144 Miteq 3008A00931</td> <td></td> <td>T125; ARA 18-26GHz; S/N:1007</td> </tr> <tr> <td colspan="4">Hi Frequency Cables</td> </tr> <tr> <td>2 foot cable</td> <td>3 foot cable</td> <td>12 foot cable</td> <td>HPF</td> <td>Reject Filter</td> </tr> <tr> <td></td> <td></td> <td>B-5m Chamber</td> <td></td> <td>R_001</td> </tr> </table> <p><b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz</p>															Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	T60; S/N: 2238 @3m	T144 Miteq 3008A00931		T125; ARA 18-26GHz; S/N:1007	Hi Frequency Cables				2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter			B-5m Chamber		R_001
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz																																	
T60; S/N: 2238 @3m	T144 Miteq 3008A00931		T125; ARA 18-26GHz; S/N:1007																																	
Hi Frequency Cables																																				
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter																																
		B-5m Chamber		R_001																																
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. 2422MHz</b>																																				
4.844	3.0	39.9	30.5	33.0	7.1	-36.5	0.0	0.0	43.6	34.2	74	54	-30.4	-19.8	V																					
4.844	3.0	41.3	33.8	33.0	7.1	-36.5	0.0	0.0	45.0	37.5	74	54	-29.0	-16.5	H																					
<b>Mid Ch. 2437MHz</b>																																				
4.874	3.0	41.6	32.4	33.1	7.2	-36.5	0.0	0.0	45.3	36.1	74	54	-28.7	-17.9	V																					
4.874	3.0	41.1	29.5	33.1	7.2	-36.5	0.0	0.0	44.8	33.2	74	54	-29.2	-20.8	H																					
<b>High Ch. 2462MHz</b>																																				
4.904	3.0	41.1	29.0	33.1	7.2	-36.5	0.0	0.0	44.9	32.8	74	54	-29.1	-21.2	V																					
4.904	3.0	41.7	32.6	33.1	7.2	-36.5	0.0	0.0	45.4	36.4	74	54	-28.6	-17.6	H																					
No more signal found																																				
Rev. 4.12.7																																				
<p>f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss</p>					<p>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</p>					<p>Avg Lim Average Field Strength Limit Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit Pk Mar Margin vs. Peak Limit</p>																										

### 7.3. TRANSMITTER ABOVE 1 GHz IN THE 5.8 GHz BAND

#### 7.3.1. TRANSMITTER ABOVE 1 GHz FOR 802.11a LEGACY MODE

##### HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: INTEL	Project #: 08U12001	Date: 8/10/2008	Test Engineer: Devin Chang	Configuration: EUT only	Mode: Tx, 5.8GHz a mode										
Test Equipment:															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz						
T120; S/N: 29310 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007						
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		
Can 187215004			C-5m Chamber							R_001					
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. 5745MHz															
11.490	3.0	49.3	35.8	37.6	1.3	-32.5	0.0	0.0	55.6	42.2	74	54	-18.4	-11.8	V
11.490	3.0	42.0	28.5	37.6	1.3	-32.5	0.0	0.0	48.3	34.8	74	54	-25.7	-19.2	H
Mid Ch. 5785MHz															
11.570	3.0	50.4	37.5	37.6	1.3	-32.5	0.0	0.0	56.7	43.8	74	54	-17.3	-10.2	V
11.570	3.0	45.6	30.1	37.6	1.3	-32.5	0.0	0.0	51.9	36.4	74	54	-22.1	-17.6	H
High Ch. 5825MHz															
11.650	3.0	54.4	41.0	37.7	1.3	-32.5	0.0	0.0	60.8	47.4	74	54	-13.2	-6.6	V
11.650	3.0	43.7	30.2	37.7	1.3	-32.5	0.0	0.0	50.0	36.5	74	54	-24.0	-17.5	H
No more signal found															
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										

### 7.3.2. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE

#### HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: INTEL Project #: 08U12001 Date: 8/10/2008 Test Engineer: Devin Chang Configuration: EUT only Mode: Tx, 5.8GHz HT20															
Test Equipment:															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz						
T120; S/N: 29310 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007						
Hi Frequency Cables															
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			
Can 187215004			C-5m Chamber									R_001			
<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 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. 5745MHz															
11.490	3.0	49.0	34.6	37.6	1.3	-32.5	0.0	0.0	55.3	41.0	74	54	-18.7	-13.0	V
11.490	3.0	42.2	28.7	37.6	1.3	-32.5	0.0	0.0	48.5	35.0	74	54	-25.5	-19.0	H
Mid Ch. 5785MHz															
11.570	3.0	51.0	37.2	37.6	1.3	-32.5	0.0	0.0	57.3	43.5	74	54	-16.7	-10.5	V
11.570	3.0	43.7	30.0	37.6	1.3	-32.5	0.0	0.0	50.0	36.3	74	54	-24.0	-17.7	H
High Ch. 5825MHz															
11.650	3.0	53.9	40.7	37.7	1.3	-32.5	0.0	0.0	60.3	47.1	74	54	-13.7	-6.9	V
11.650	3.0	43.9	29.9	37.7	1.3	-32.5	0.0	0.0	50.3	36.3	74	54	-23.7	-17.7	H
No more signal found															
Rev. 4.12.7															
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					

### 7.3.3. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE

#### HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber															
Company: INTEL Project #: 08U12001 Date: 8/10/2008 Test Engineer: Devin Chang Configuration: EUT only Mode: Tx, 5.8GHz HT40															
Test Equipment:															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz						
T120; S/N: 29310 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007						
Hi Frequency Cables															
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			
Can 187215004			C-5m Chamber									R_001			
Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch. 5755MHz															
11.510	3.0	49.2	35.0	37.6	1.3	-32.5	0.0	0.0	55.5	41.3	74	54	-18.5	-12.7	V
11.510	3.0	43.7	29.7	37.6	1.3	-32.5	0.0	0.0	50.1	36.0	74	54	-23.9	-18.0	H
High Ch. 5795MHz															
11.590	3.0	50.1	36.2	37.6	1.3	-32.5	0.0	0.0	56.5	42.6	74	54	-17.5	-11.4	V
11.590	3.0	44.3	30.6	37.6	1.3	-32.5	0.0	0.0	50.6	36.9	74	54	-23.4	-17.1	H
No more signal found															
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											

## 7.4. RECEIVER ABOVE 1 GHz

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																																																																																																																																																																																																																																																																																		
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1.195	3.0	53.0	38.2	28.6	3.5	-39.2	0.0	0.0	45.9	31.1	74	54	-28.1	-22.9	V																																																																																																																																																																																																																																																																																																																																			
1.597	3.0	53.5	33.4	30.1	4.0	-38.6	0.0	0.0	49.0	28.9	74	54	-25.0	-25.1	V																																																																																																																																																																																																																																																																																																																																			
1.993	3.0	46.5	33.1	31.6	4.5	-38.1	0.0	0.0	44.5	31.1	74	54	-29.5	-22.9	V																																																																																																																																																																																																																																																																																																																																			
3.001	3.0	50.1	50.7	32.8	5.6	-37.4	0.0	0.0	51.2	51.7	74	54	-22.8	-2.3	V																																																																																																																																																																																																																																																																																																																																			
1.195	3.0	62.4	40.1	28.6	3.5	-39.2	0.0	0.0	55.3	33.0	74	54	-18.7	-21.0	H																																																																																																																																																																																																																																																																																																																																			
1.594	3.0	54.3	33.5	30.1	4.0	-38.6	0.0	0.0	49.7	28.9	74	54	-24.3	-25.1	H																																																																																																																																																																																																																																																																																																																																			
1.993	3.0	52.0	32.1	31.6	4.5	-38.1	0.0	0.0	50.0	30.1	74	54	-24.0	-23.9	H																																																																																																																																																																																																																																																																																																																																			
3.001	3.0	49.1	45.8	32.8	5.6	-37.4	0.0	0.0	50.1	46.8	74	54	-23.9	-7.2	H																																																																																																																																																																																																																																																																																																																																			
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<table border="1"> <tr> <td>f</td> <td>Measurement Frequency</td> <td>Amp</td> <td>Preamp Gain</td> <td>Avg Lim</td> <td>Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td>Distance to Antenna</td> <td>D Corr</td> <td>Distance Correct to 3 meters</td> <td>Pk Lim</td> <td>Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td>Analyzer Reading</td> <td>Avg</td> <td>Average Field Strength @ 3 m</td> <td>Avg Mar</td> <td>Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td>Antenna Factor</td> <td>Peak</td> <td>Calculated Peak Field Strength</td> <td>Pk Mar</td> <td>Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td>Cable Loss</td> <td>HPF</td> <td>High Pass Filter</td> <td></td> <td></td> </tr> </table>															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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## 7.5. WORST-CASE BELOW 1 GHz

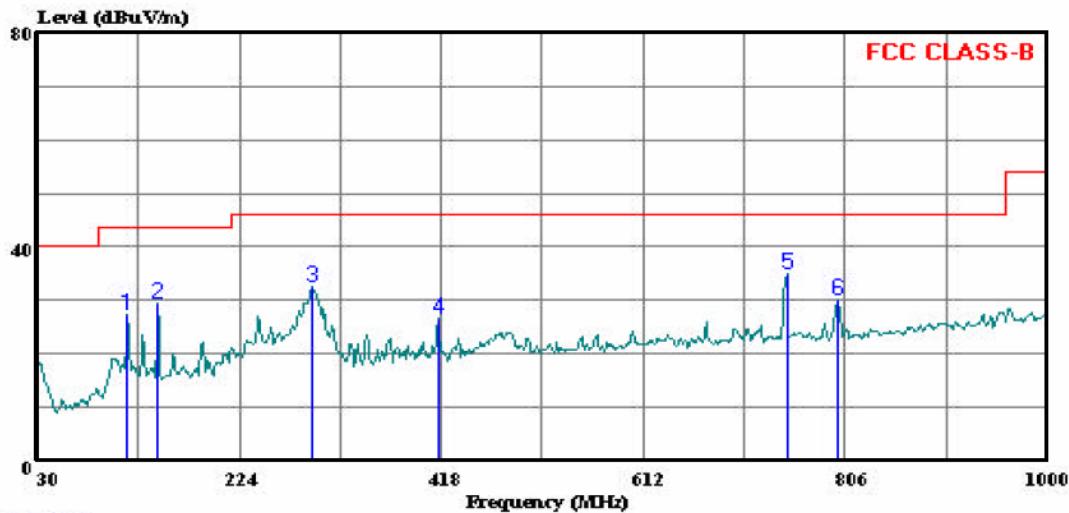
### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

#### HORIZONTAL PLOT



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

Data#: 2 File#: 08U12001.EMI Date: 08-06-2008 Time: 15:00:44



(Fremont)

Trace: 1

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL  
Test Operator:: Devin Chang  
Project #: : 08u12001  
Company: : INTEL  
Configuration:: EUT with NB  
Mode : : PA3655U-1MPC  
Target: : FCC Class B

HORIZONTAL DATA

Freq	Read		Level	Limit	Over	Line	Limit	Remark
	Level	Factor						
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	116.330	40.50	-13.20	27.30	43.50	-16.20	Peak	
2	145.430	43.09	-13.61	29.48	43.50	-14.02	Peak	
3	293.840	43.75	-11.34	32.41	46.00	-13.59	Peak	
4	415.090	34.31	-7.68	26.63	46.00	-19.37	Peak	
5	749.740	34.75	0.13	34.88	46.00	-11.12	Peak	
6	798.240	29.23	0.76	29.99	46.00	-16.01	Peak	

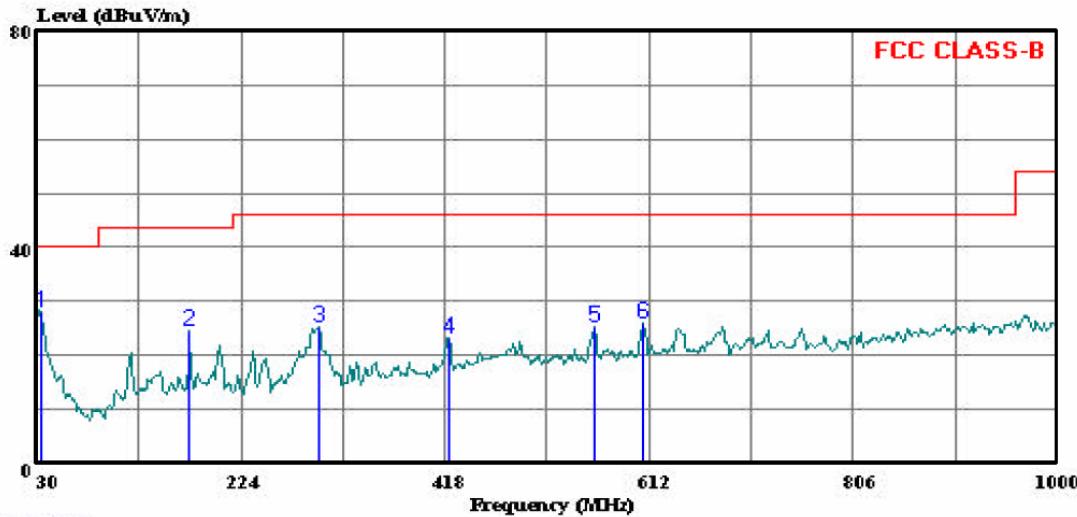
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



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

Data#: 4 File#: 08U12001.EMI Date: 08-06-2008 Time: 15:12:50



(Fremont)  
Trace: 3

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Test Operator:: Devin Chang  
Project #: 08u12001  
Company: INTEL  
Configuration:: EUT with NB  
Mode : PA3655U-1MPC  
Target: FCC Class B

VERTICAL DATA

Freq	Read		Level	Limit	Over	Limit	Remark
	Level	Factor					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	33.880	38.53	-10.62	27.91	40.00	-12.09	Peak
2	174.530	39.18	-14.51	24.67	43.50	-18.83	Peak
3	298.690	36.36	-11.14	25.22	46.00	-20.78	Peak
4	421.880	30.70	-7.47	23.23	46.00	-22.77	Peak
5	560.590	28.77	-3.62	25.15	46.00	-20.85	Peak
6	606.180	28.52	-2.67	25.85	46.00	-20.15	Peak

## 8. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> 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 receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

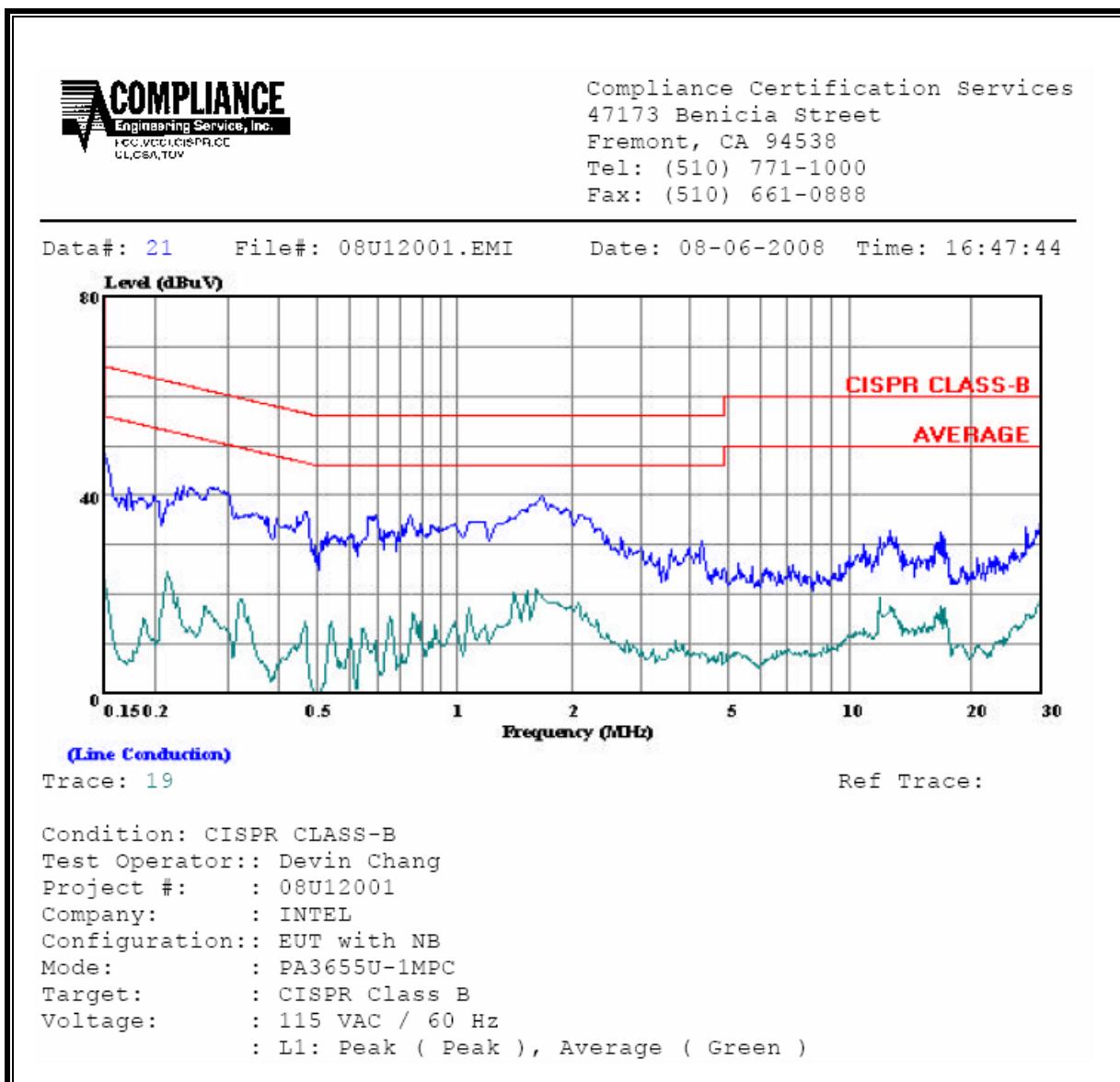
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

#### 6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Closs (dB)	Limit QP	FCC B AV	Margin		Remark
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.21	41.83	--	24.56	0.00	63.05	53.05	-21.22	-28.49	L1
0.33	36.86	--	19.06	0.00	59.58	49.58	-22.72	-30.52	L1
1.73	39.98	--	21.12	0.00	56.00	46.00	-16.02	-24.88	L1
0.21	41.33	--	23.45	0.00	63.05	53.05	-21.72	-29.60	L2
0.33	35.76	--	19.35	0.00	59.45	49.45	-23.69	-30.10	L2
1.78	37.85	--	19.35	0.00	56.00	46.00	-18.15	-26.65	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

