



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

**CERTIFICATION TEST REPORT**

**FOR**

**INTEL WI-FI LINK 5300 SERIES**

**FCC MODEL: 533AN\_MMW  
IC MODEL: 533ANMU**

**FCC ID: PD9533ANMU  
IC: 1000M-533ANMU**

**REPORT NUMBER: 08U12063-1A**

**ISSUE DATE: SEPTEMBER 15, 2008**

*Prepared for*  
**INTEL CORPORATION  
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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	09/12/08	Initial Issue	T. Chan
A	09/15/08	Revised report to remove all instances of Caramel and replace with LENOVO THINKPAD X200 TABLET SERIES	A. Zaffar

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** INTEL CORPORATION  
2111 NE 25TH AVENUE  
HILLSBORO, OREGON 97124, USA

**EUT DESCRIPTION:** INTEL WI-FI LINK 5300

**FCC MODEL:** 533AN\_MMW

**IC MODEL:** 533ANMU

**SERIAL NUMBER:** 001D72920092

**DATE TESTED:** SEPTEMBER 04 - 10, 2008

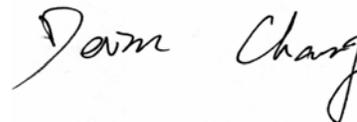
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

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:

Tested By:



THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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 5300 Series  
The radio module is manufactured by Intel.

### 5.2. MAXIMUM OUTPUT POWER

The test measurement passed within  $\pm 0.5$ dBm of the original output power.

### 5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding portable tablet LENOVO THINKPAD X200 TABLET SERIES.

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes PIFA antennas, with maximum gain as below:

Band	Ant Main	Ant Aux	Ant MIMO
<b>Acon</b>			
2.4GHz	-0.39	0.64	-0.50
5.15-5.25GHz	1.45	-2.38	-0.61
5.25-5.35GHz	1.45	-0.88	0.27
5.4-5.725GHz	1.47	-1.30	0.97
5.725-5.850GHz	0.92	0.22	1.13
<b>Winstron</b>			
2.4GHz	-1.53	1.32	-0.84
5.15-5.25GHz	0.45	-2.17	-0.44
5.25-5.35GHz	0.92	-1.41	0.25
5.4-5.725GHz	0.03	0.69	-0.21
5.725-5.850GHz	-0.76	0.14	-0.21

### 5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was CRTU, version 5.0.69.0

## 5.6. 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.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	LCM-1 SIT	1S814Y12GLV002MY	DoC
AC Adapter	Lenovo	92P1211	11S92P1211Z1ZDDY83S2C6	DoC

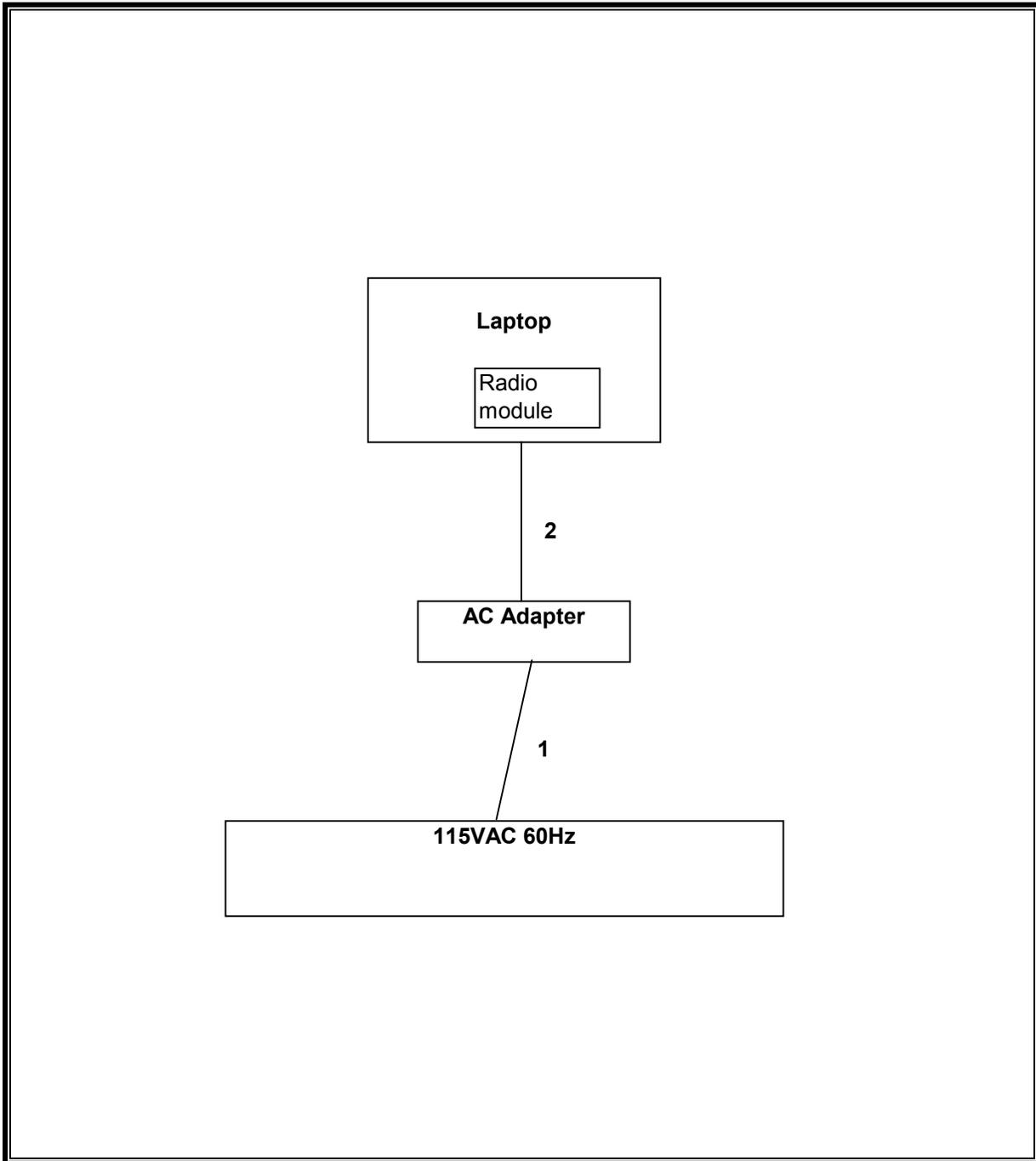
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	0.8m	NA
2	DC	1	DC	Un-shielded	1.8m	Ferrite at laptop's end

### 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
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	09/27/08
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/09
Preamp, 1000MHz	Sonoma	310N	N02891	03/31/09
Antenna, Bilog, 2 GHz	Sund Sciences	JB1	C01011	09/28/08
EMI Receiver, 29 GHz	Agilent / HP	8542E	C00957	09/19/09
RF Filter Section, 29 GHz	Agilent / HP	85420E	C00958	09/19/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/08
EMI Test Receiver, 30 MHz	R&S	ESH-S20	N02396	08/06/09
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	09/28/08
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	03/03/09
Highpass Filter, 4.0 GHz	Macro-Tronics	HPM13351	N02709	CNR
Highpass Filter, 7.6 GHz	Macro-Tronics	HPM13195	N02681	CNR
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/08
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	04/29/09

## 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.

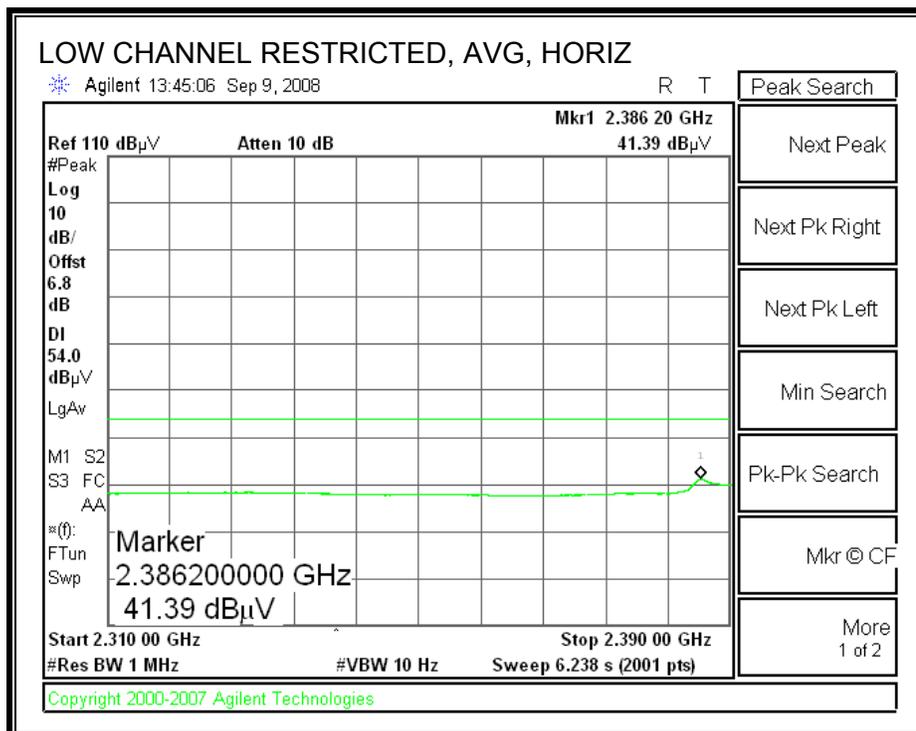
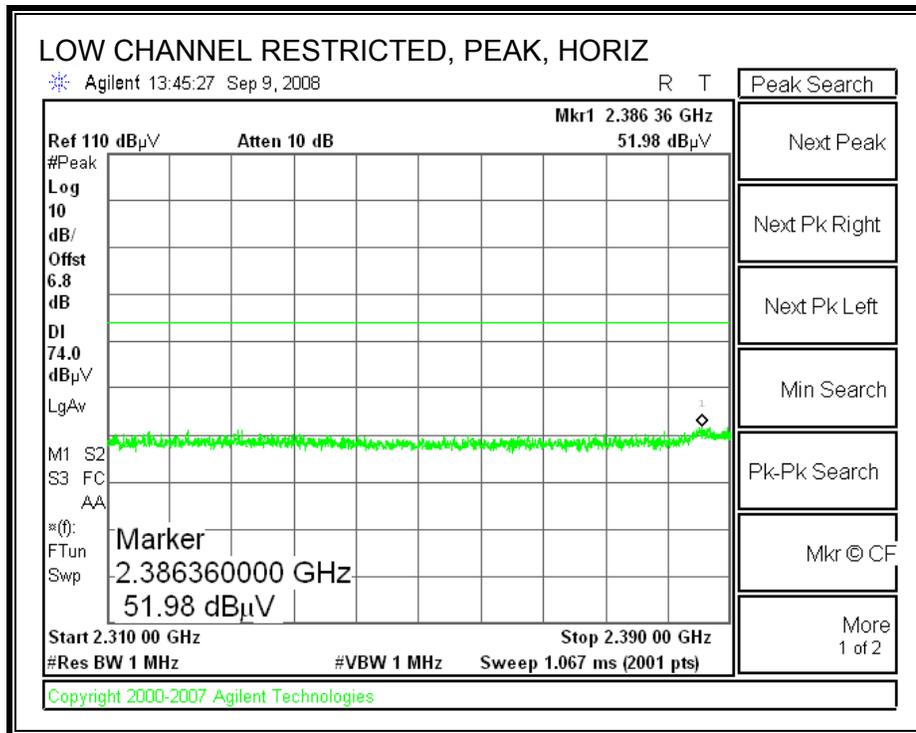
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

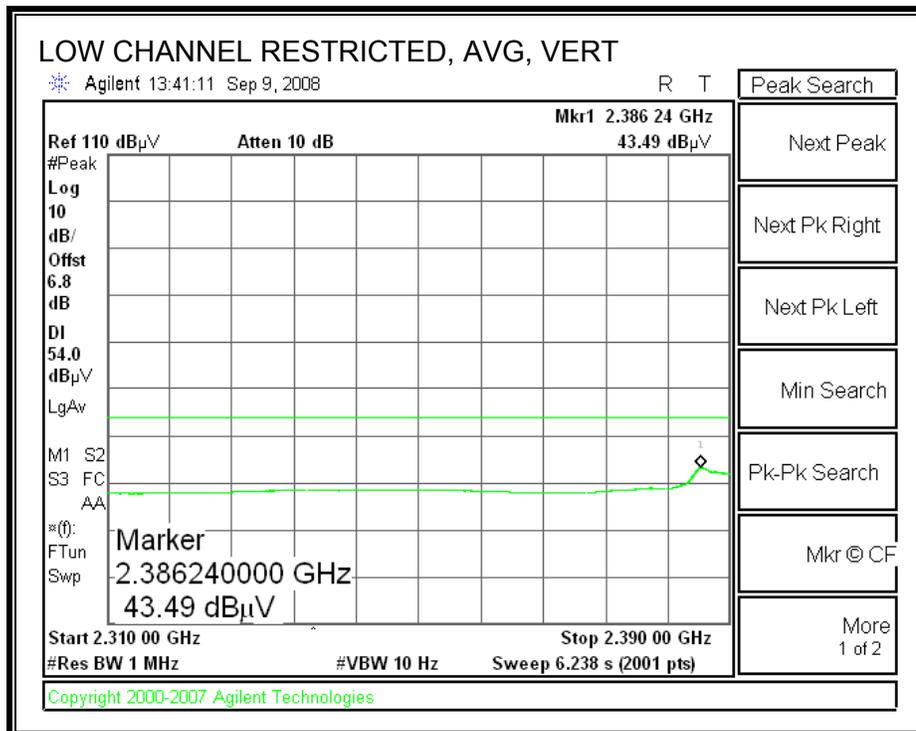
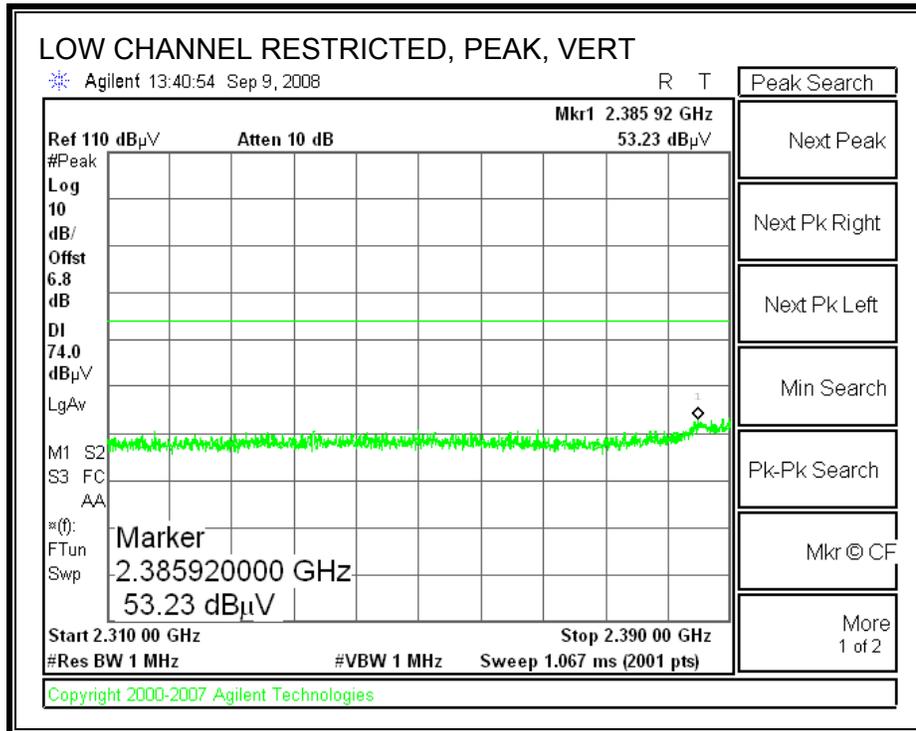
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 7.2. TRANSMITTER ABOVE 1 GHz

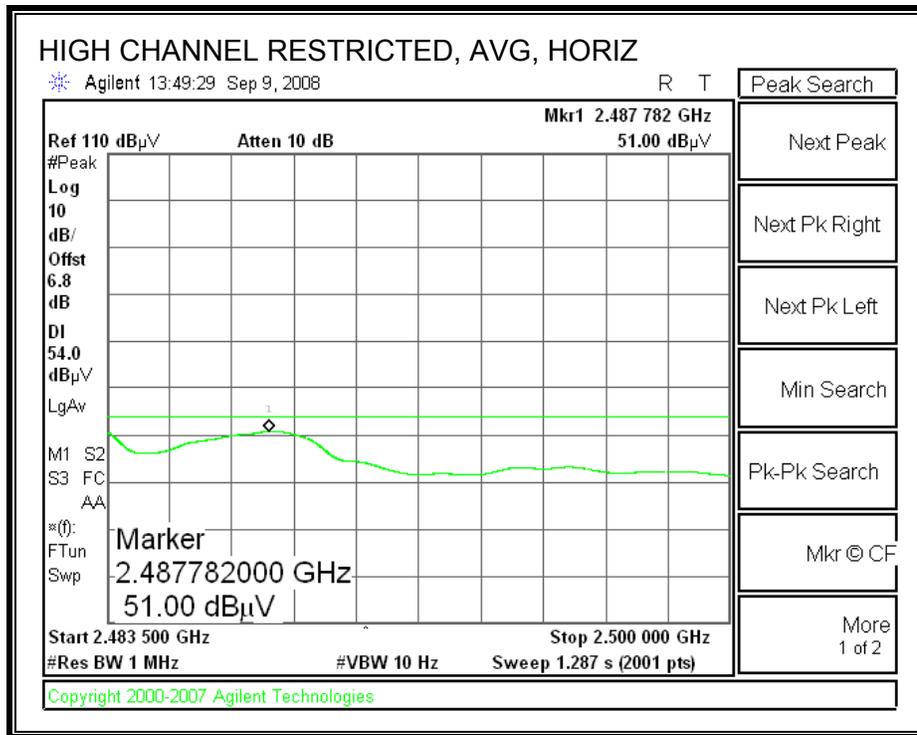
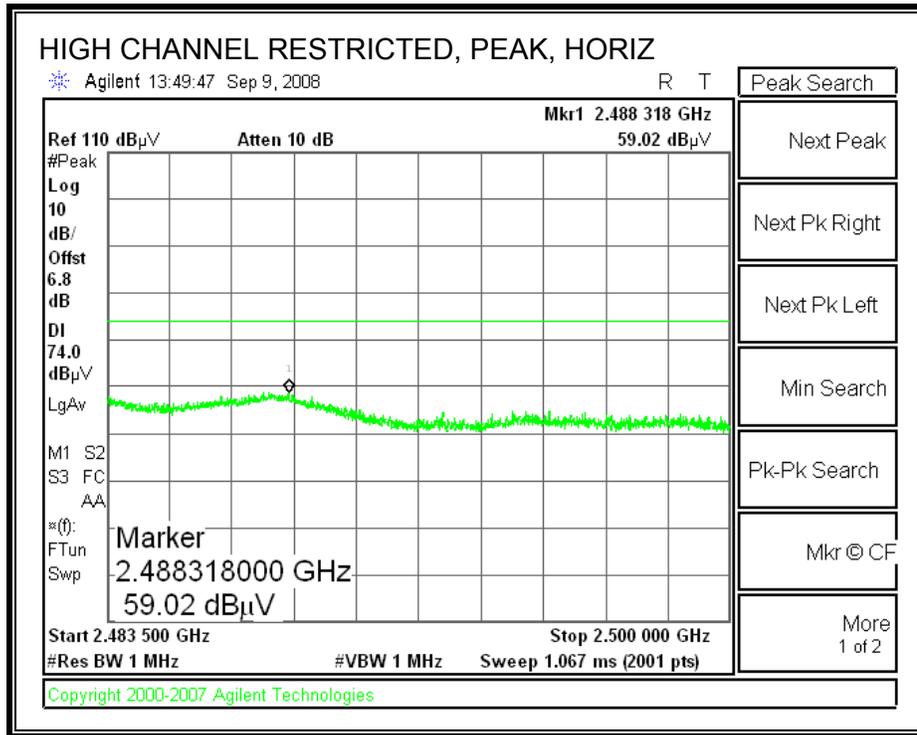
### 7.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



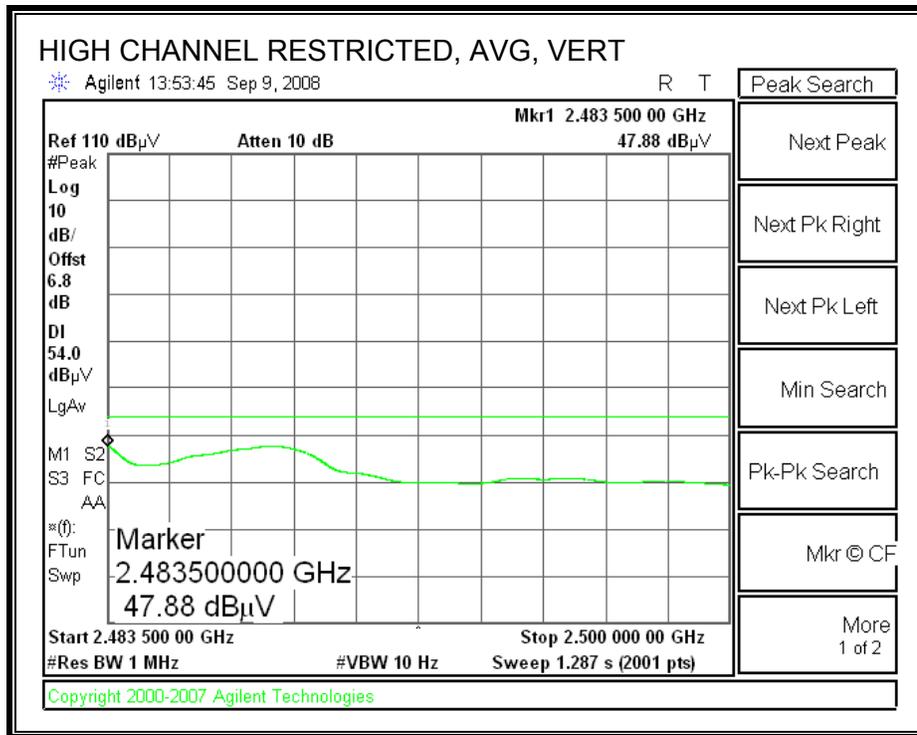
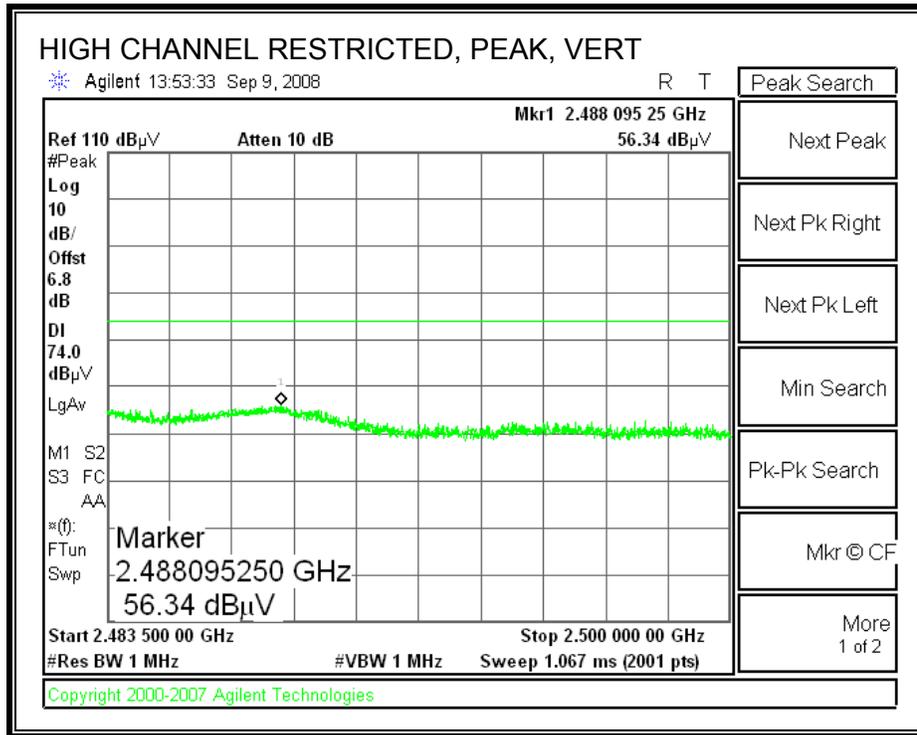
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**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 #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_TX\_B mode, Antenna C

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

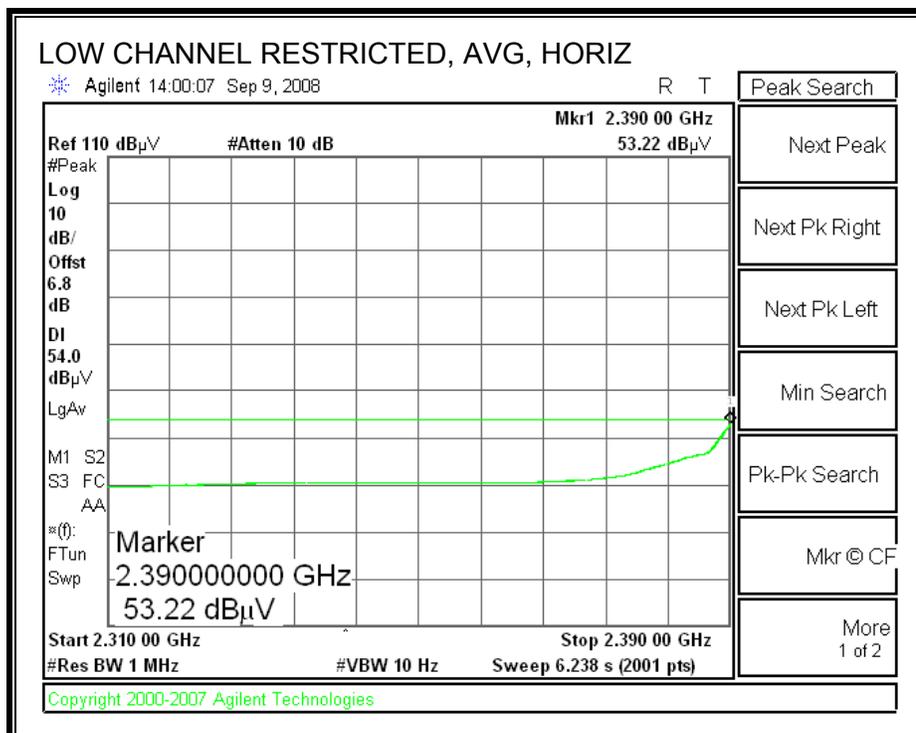
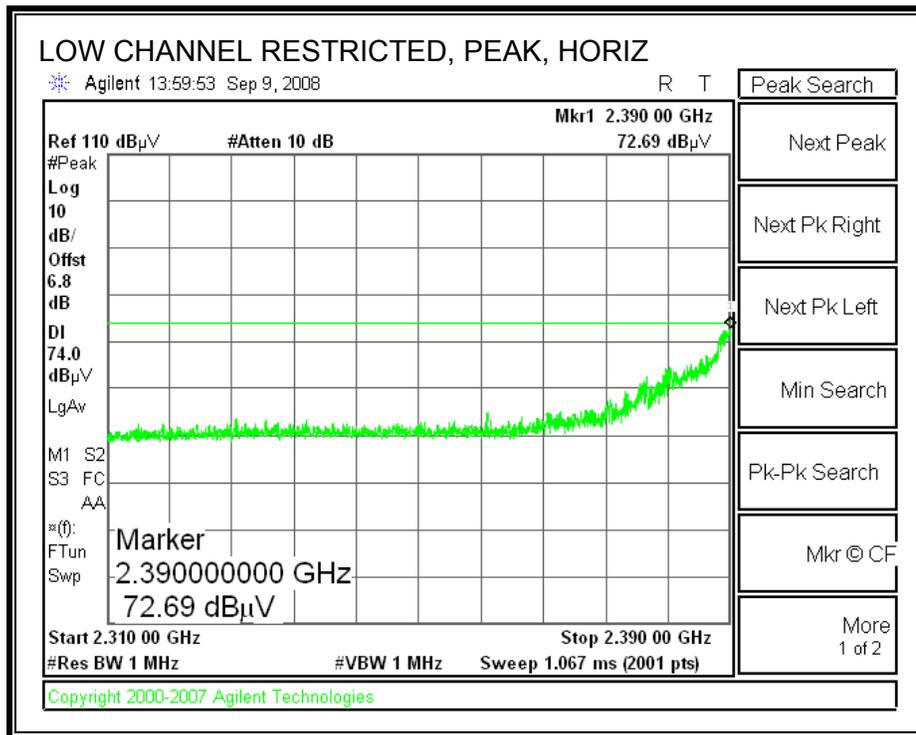
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	Average Measurements RBW=1MHz ; VBW=10Hz

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>High Ch, 2462MHz</b>															
4.924	3.0	45.8	40.0	33.9	3.1	-34.8	0.0	0.0	48.0	42.1	74	54	-26.0	-11.9	V
4.924	3.0	50.0	46.8	33.9	3.1	-34.8	0.0	0.0	52.1	48.9	74	54	-21.9	-5.1	H

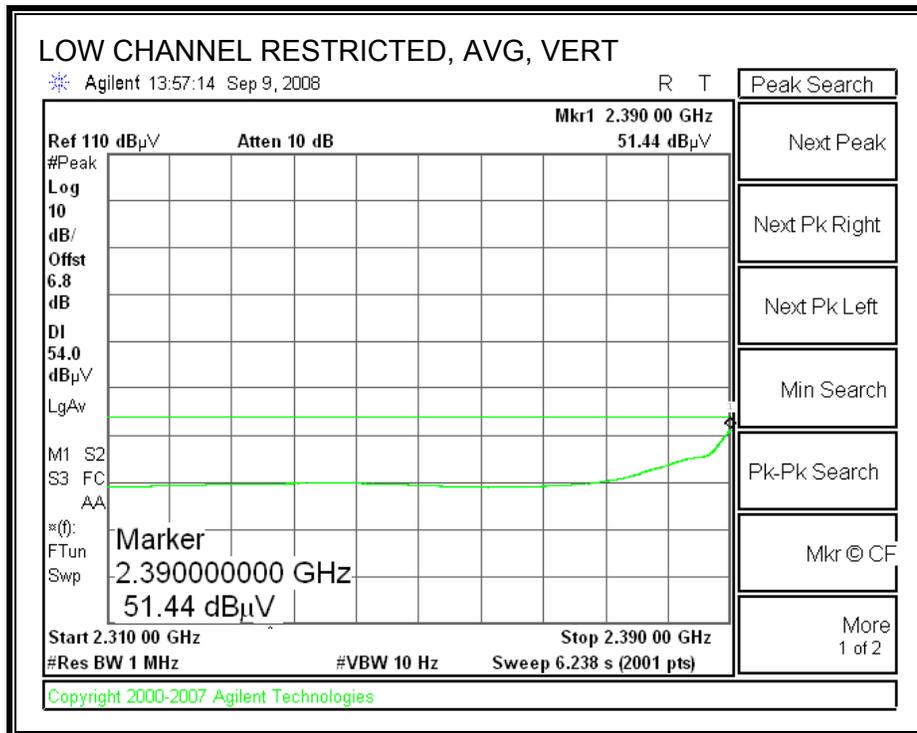
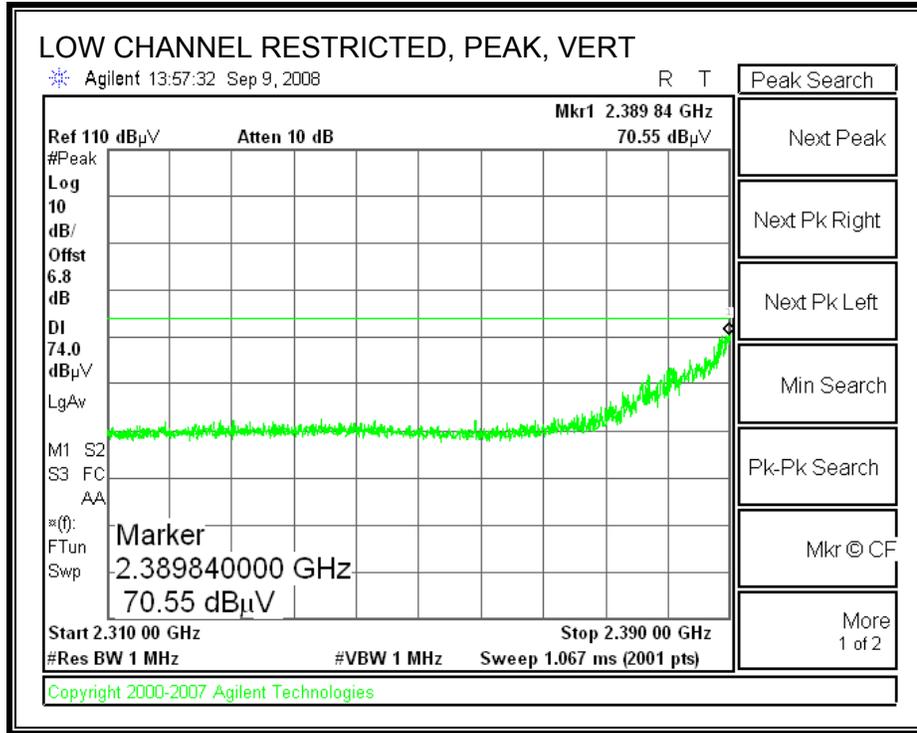
Rev. 4.12.7  
 Note: No other emissions were detected above the system noise floor.

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		

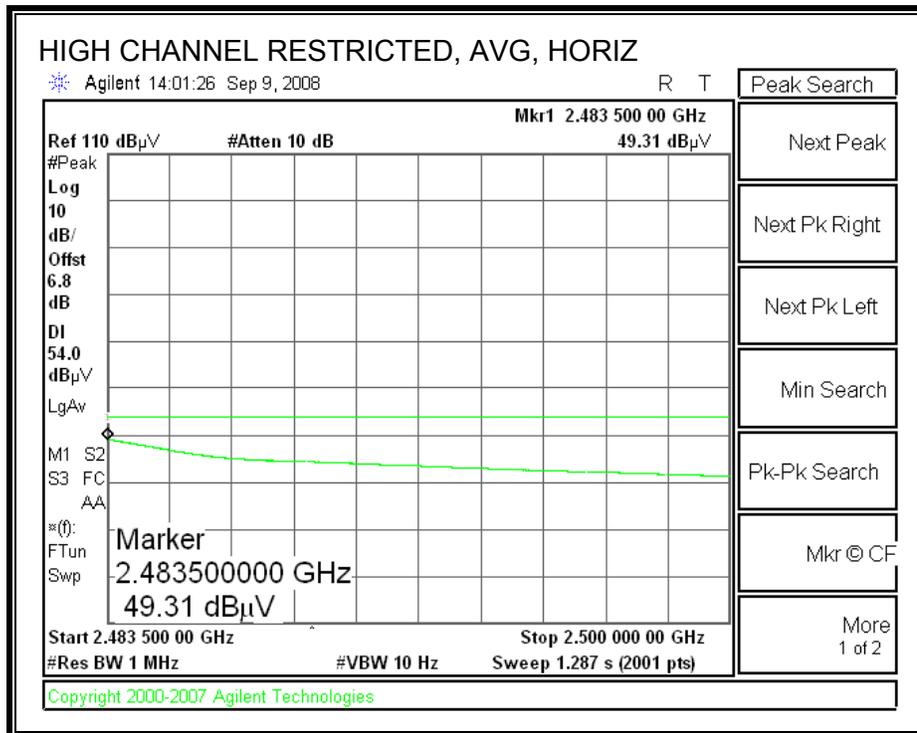
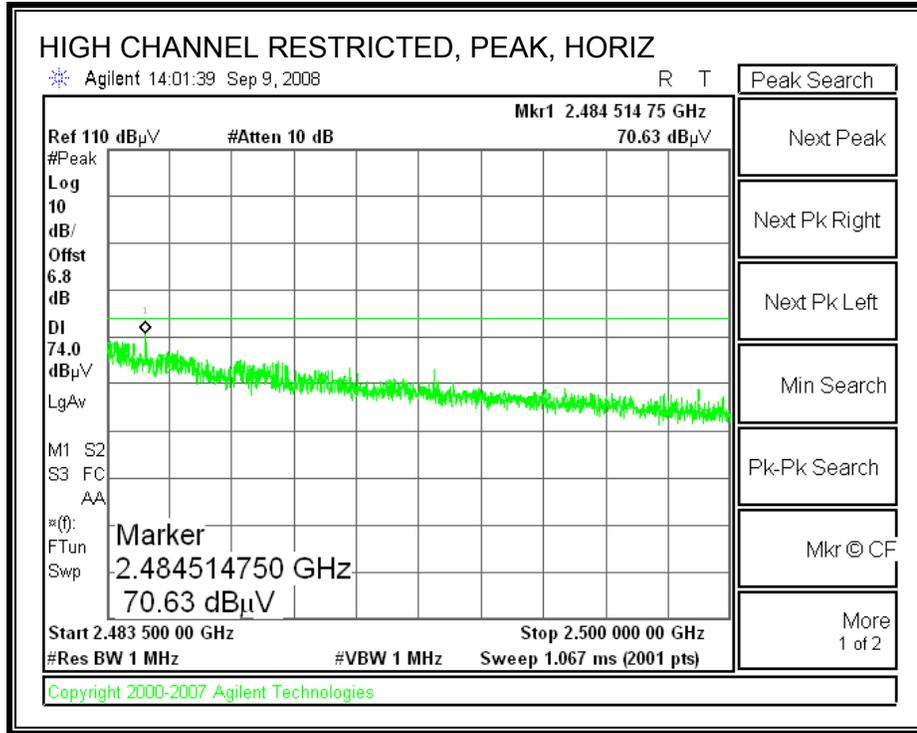
**7.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



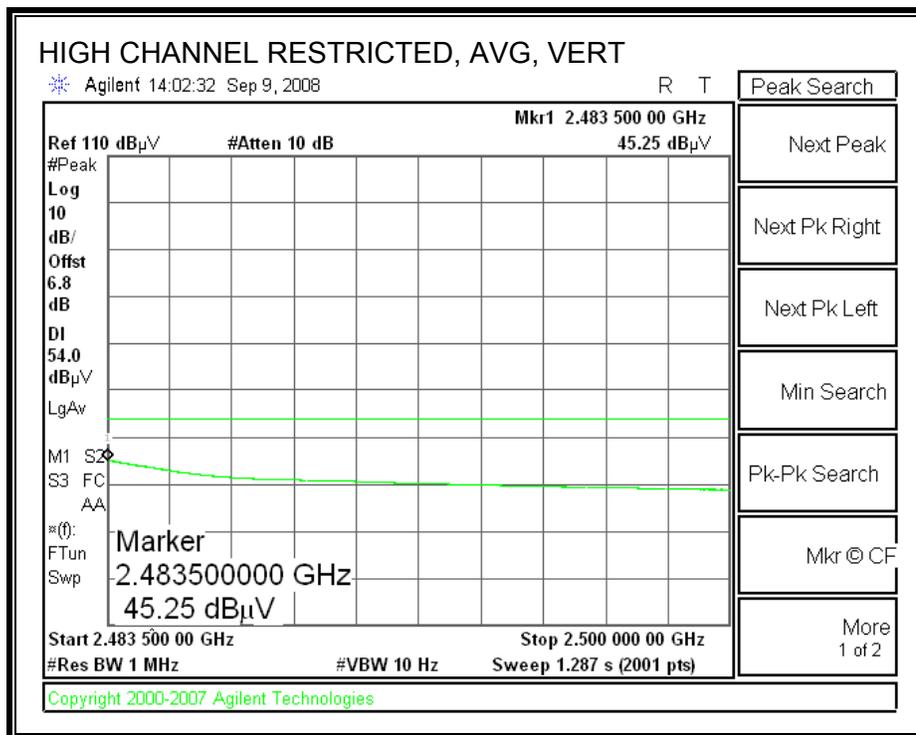
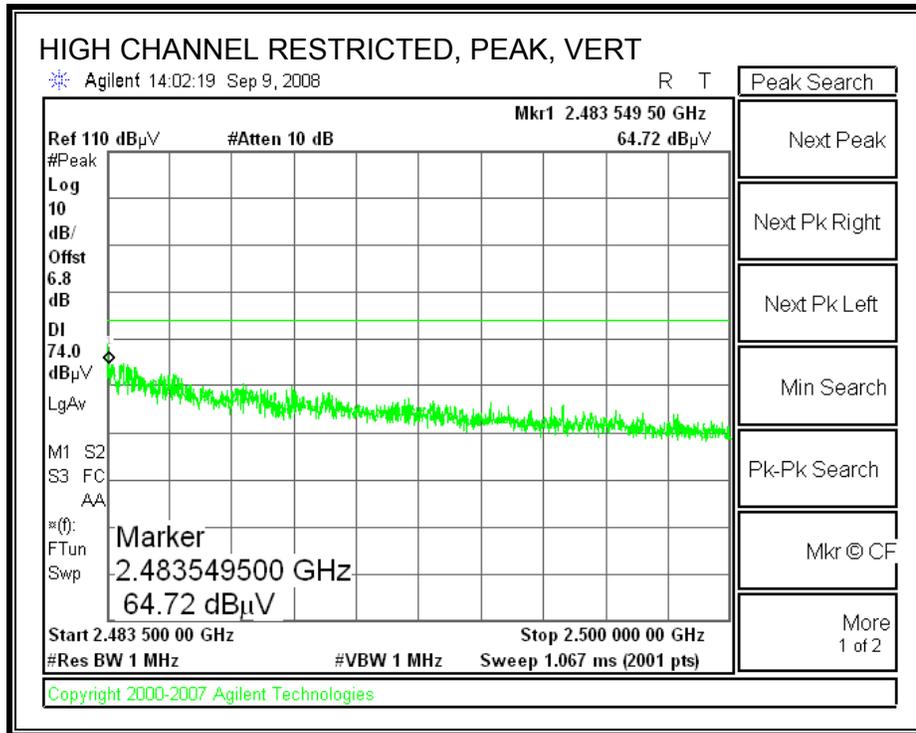
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**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 #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_TX\_G mode, Antenna B

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

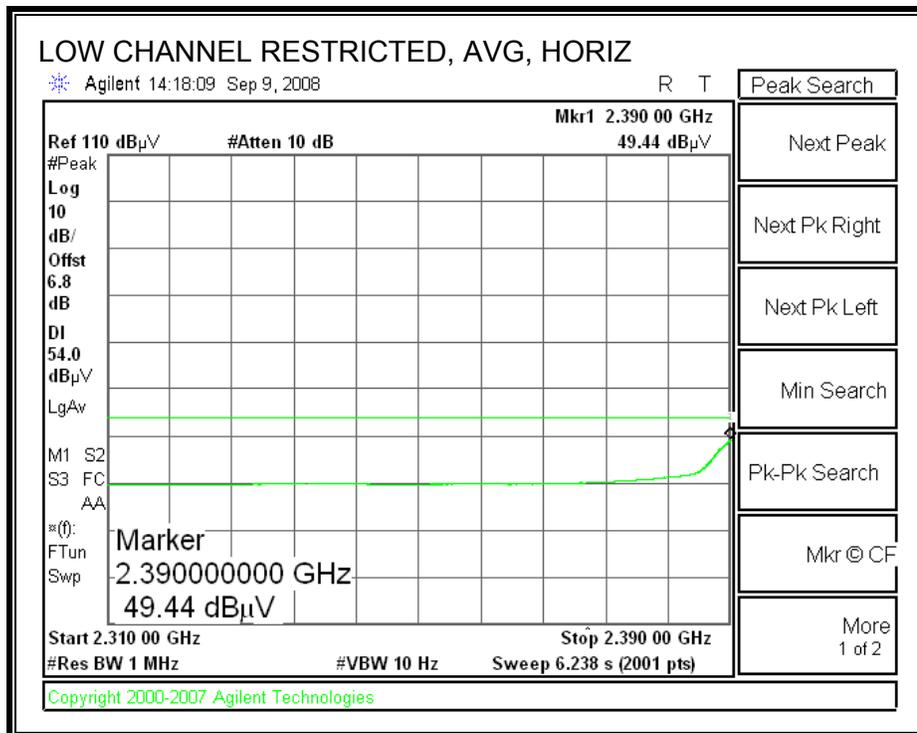
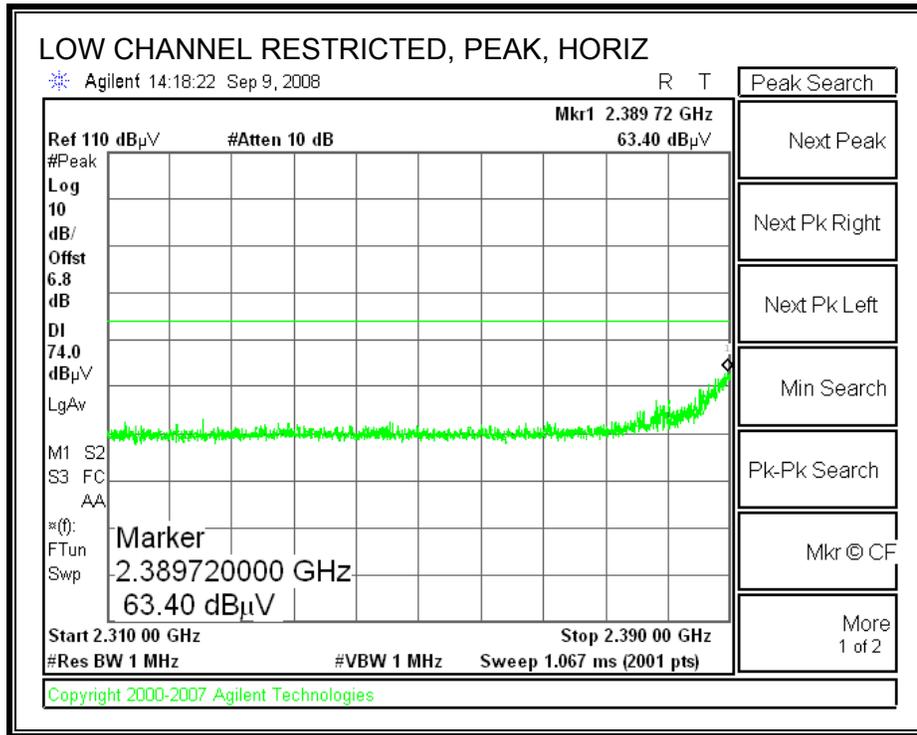
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	
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f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
2412MHz															
4.824	3.0	44.3	30.6	33.7	3.1	-34.8	0.0	0.0	46.3	32.5	74	54	-27.7	-21.5	V
4.824	3.0	43.7	30.6	33.7	3.1	-34.8	0.0	0.0	45.7	32.5	74	54	-28.3	-21.5	H

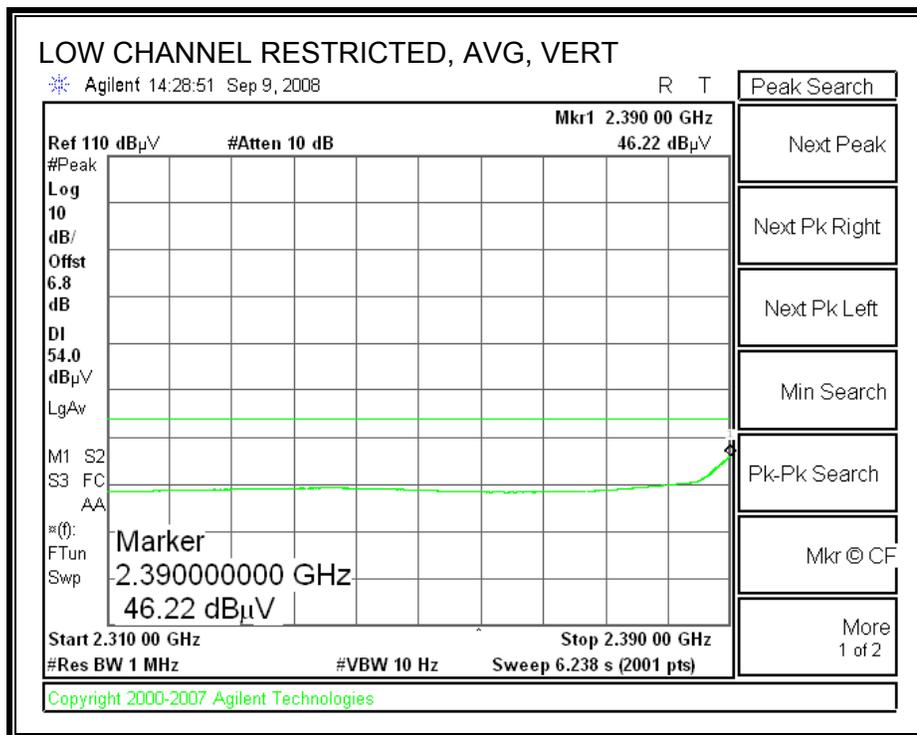
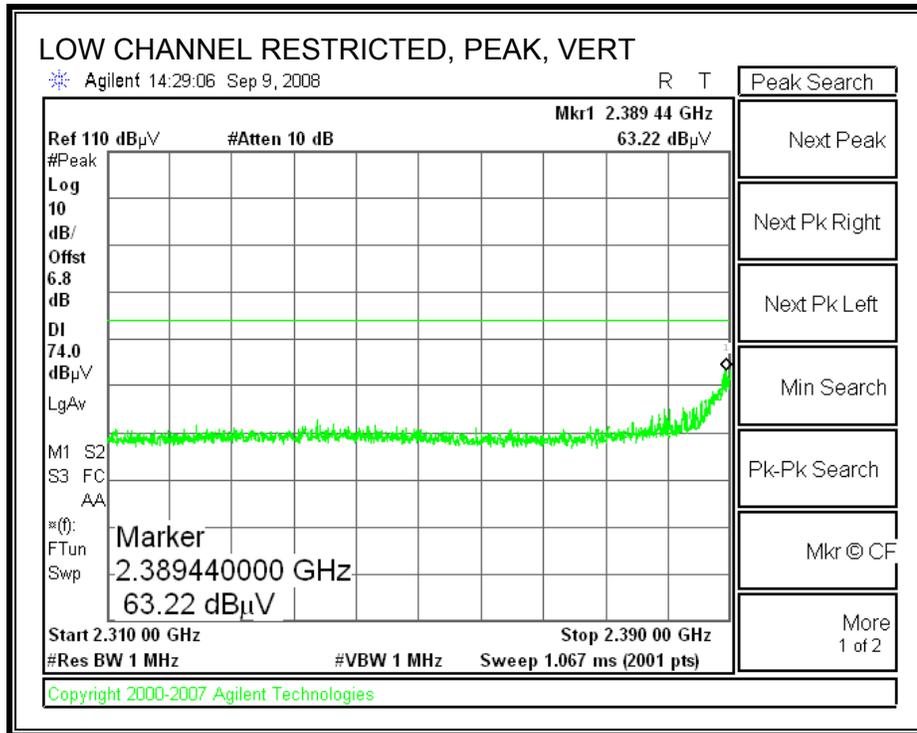
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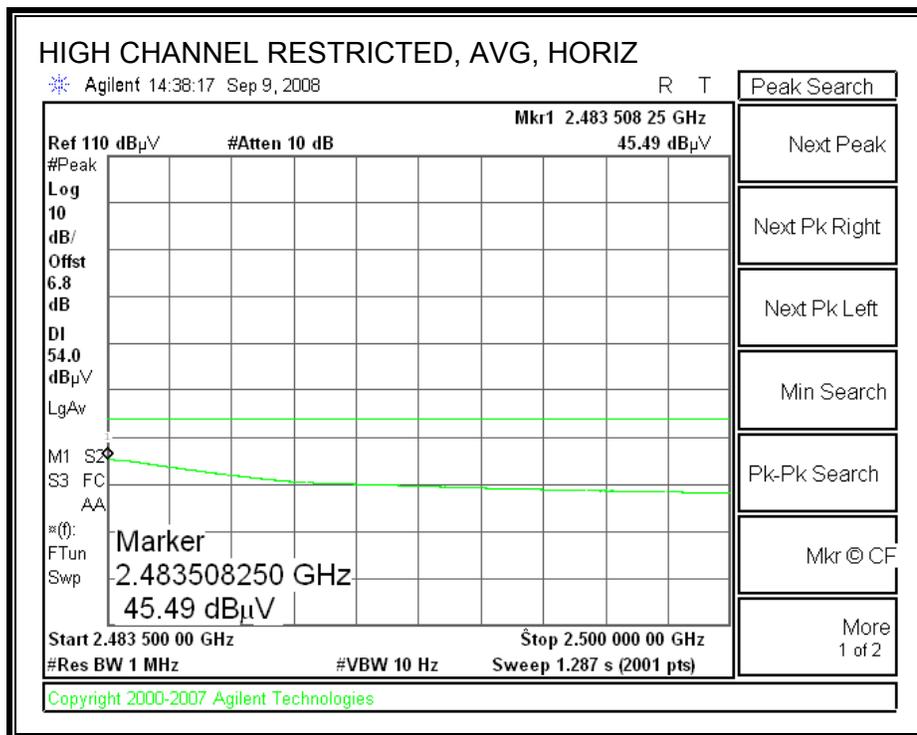
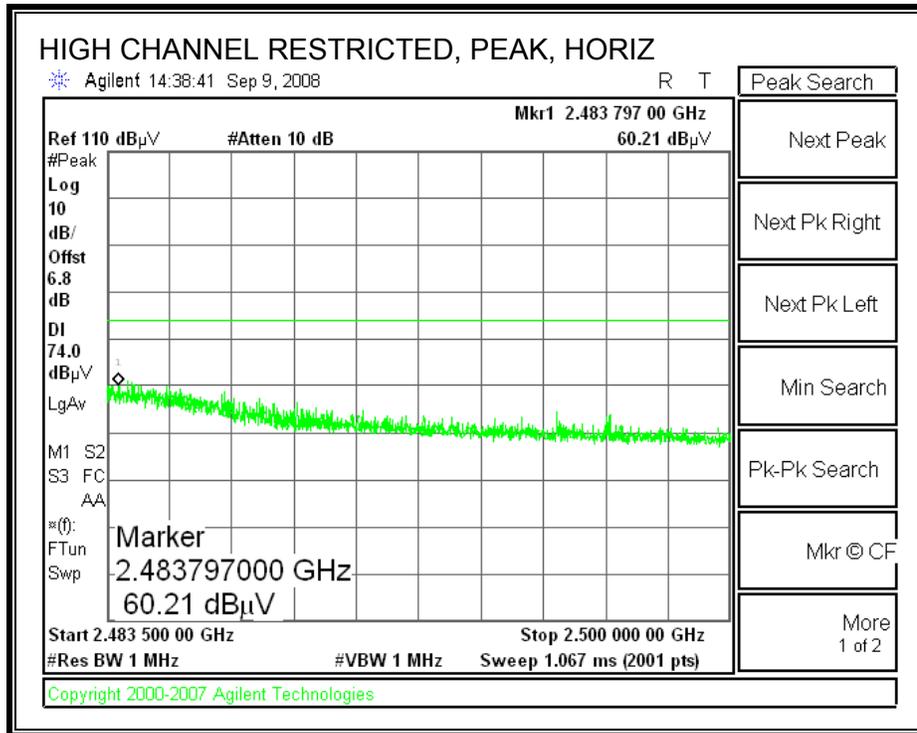
**7.2.3. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE  
 RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



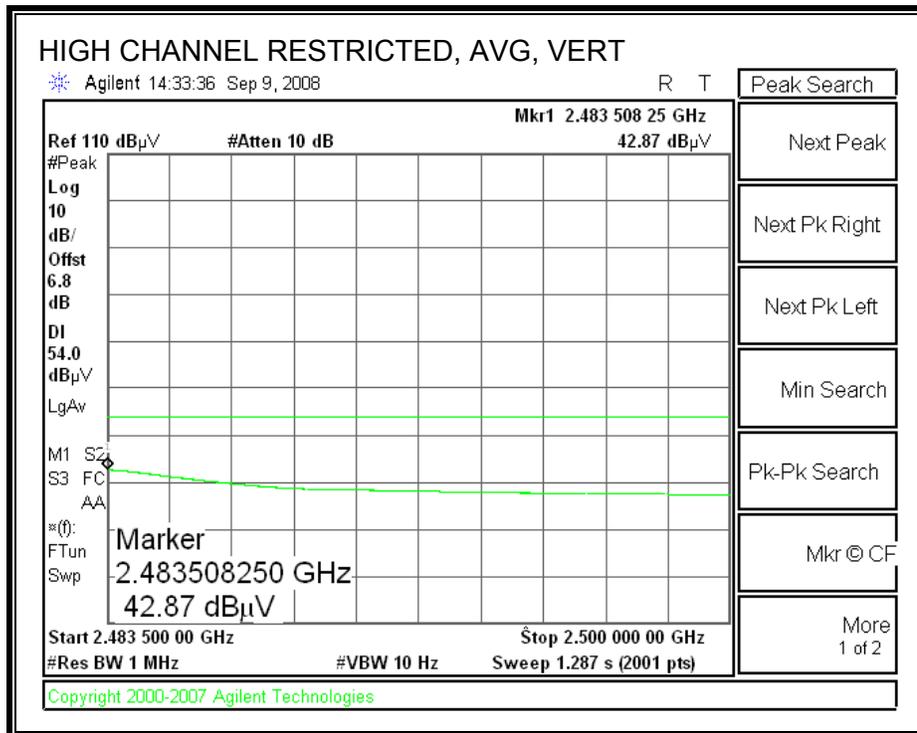
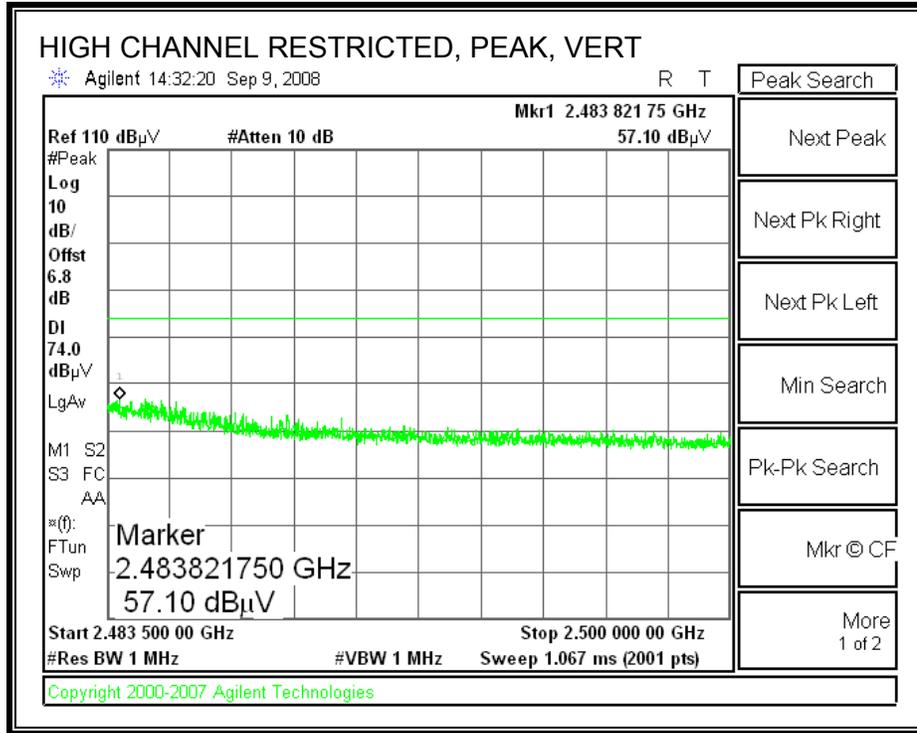
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**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



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



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Intel  
 Project #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_TX\_HT20 mode, Antenna C

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

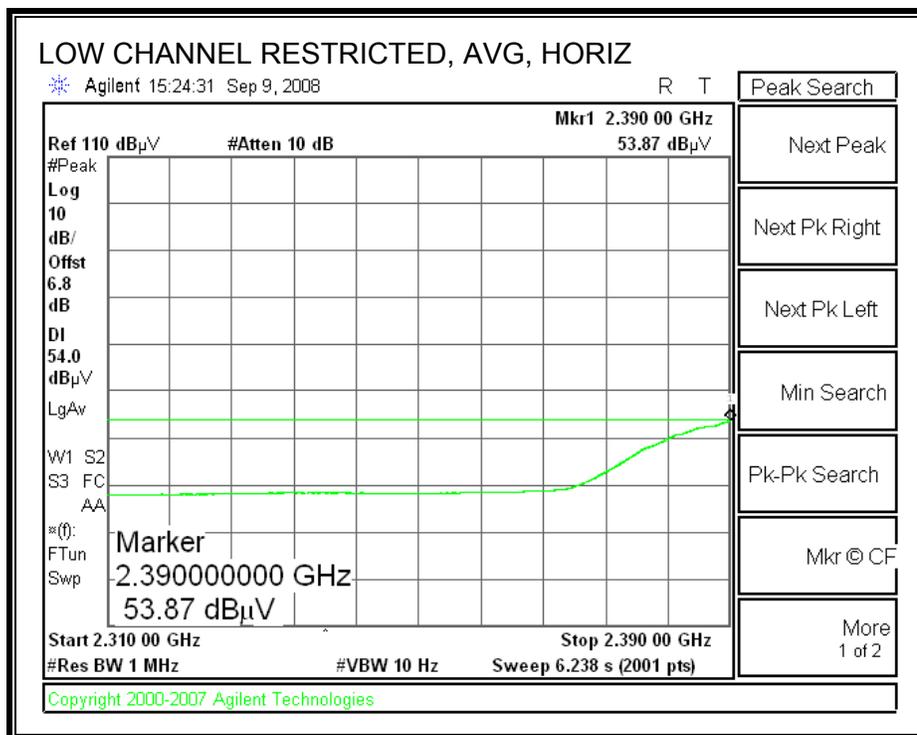
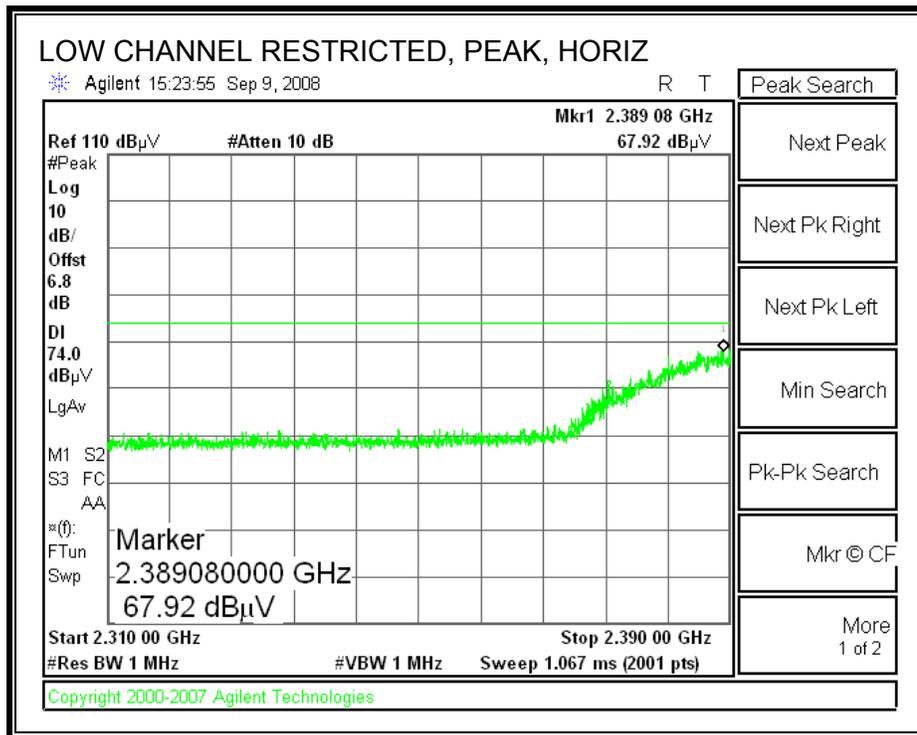
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	Average Measurements RBW=1MHz ; VBW=10Hz

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)
2437MHz															
4.874	3.0	42.8	30.5	33.8	3.1	-34.8	0.0	0.0	44.9	32.5	74	54	-29.1	-21.5	V
4.874	3.0	45.6	32.0	33.8	3.1	-34.8	0.0	0.0	47.7	34.0	74	54	-26.3	-20.0	H

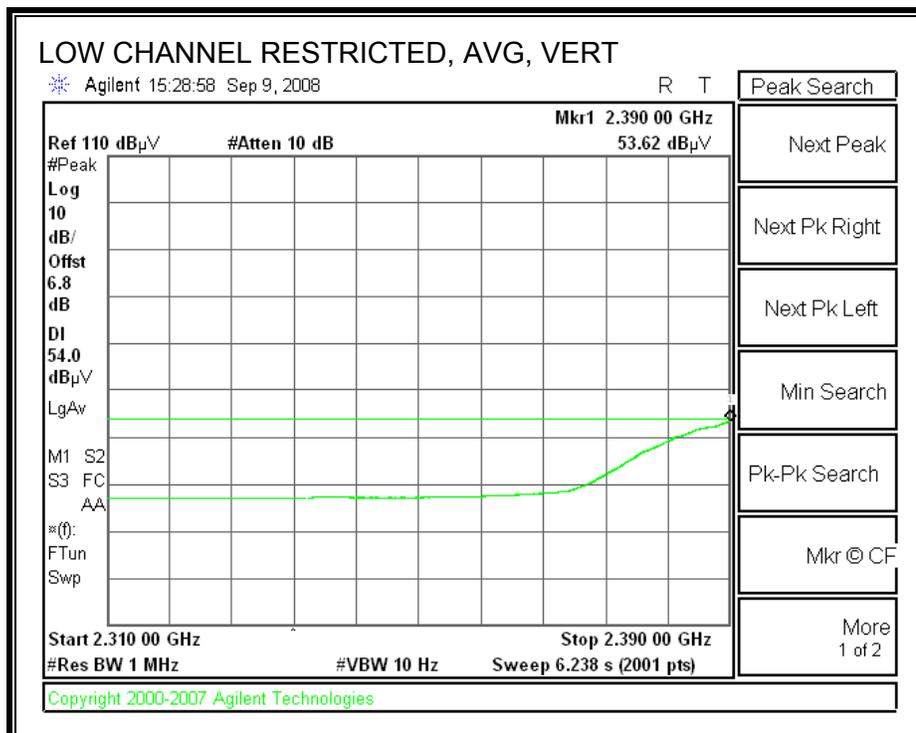
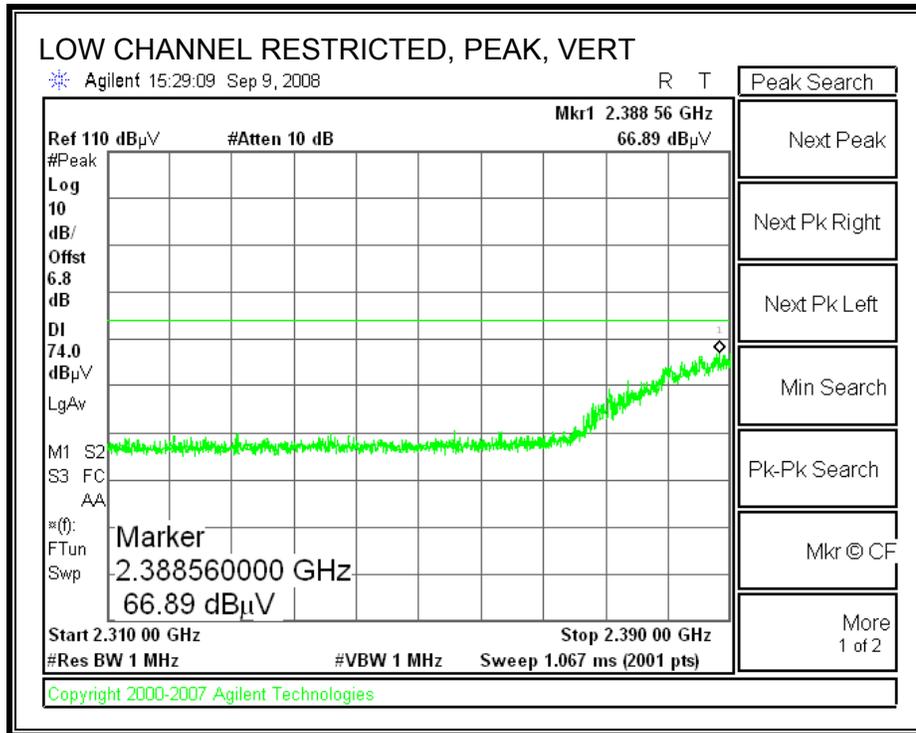
Rev. 4.12.7  
**Note: No other emissions were detected above the system noise floor.**

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		

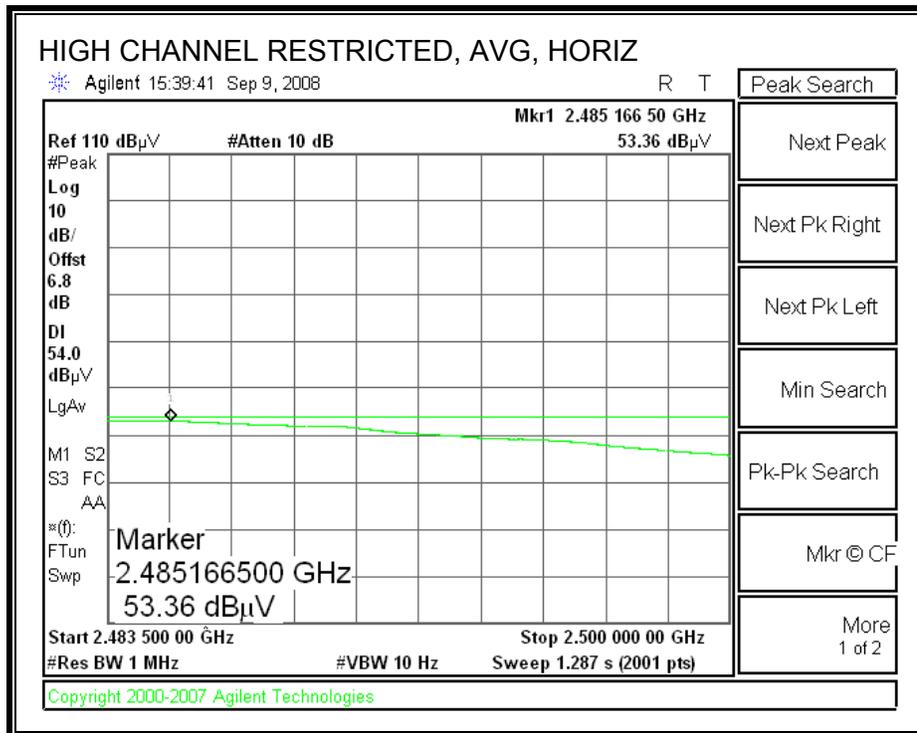
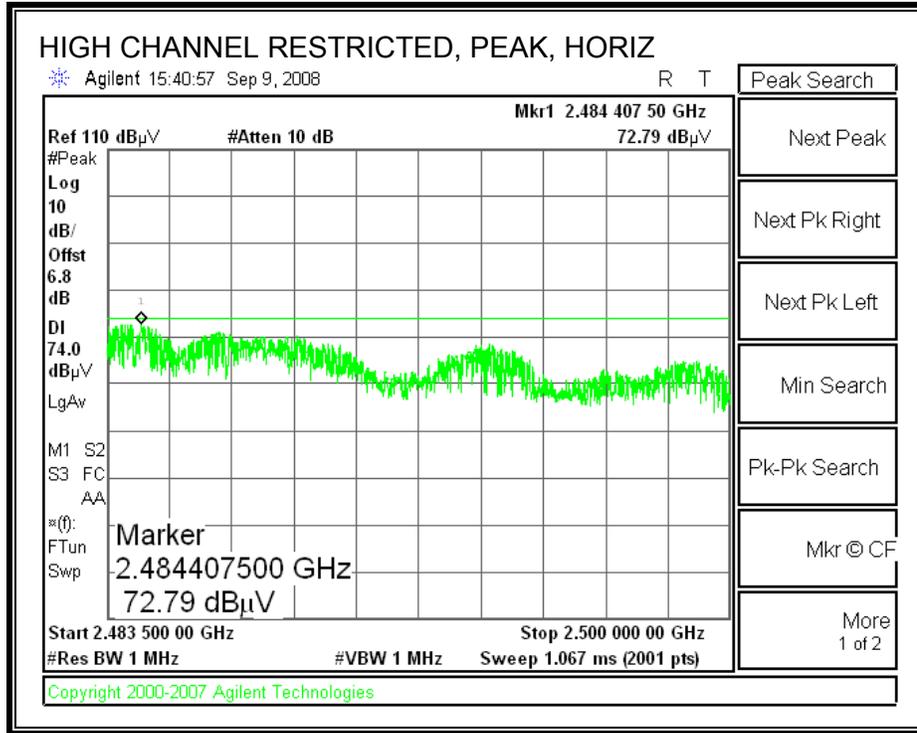
**7.2.4. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE  
 RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



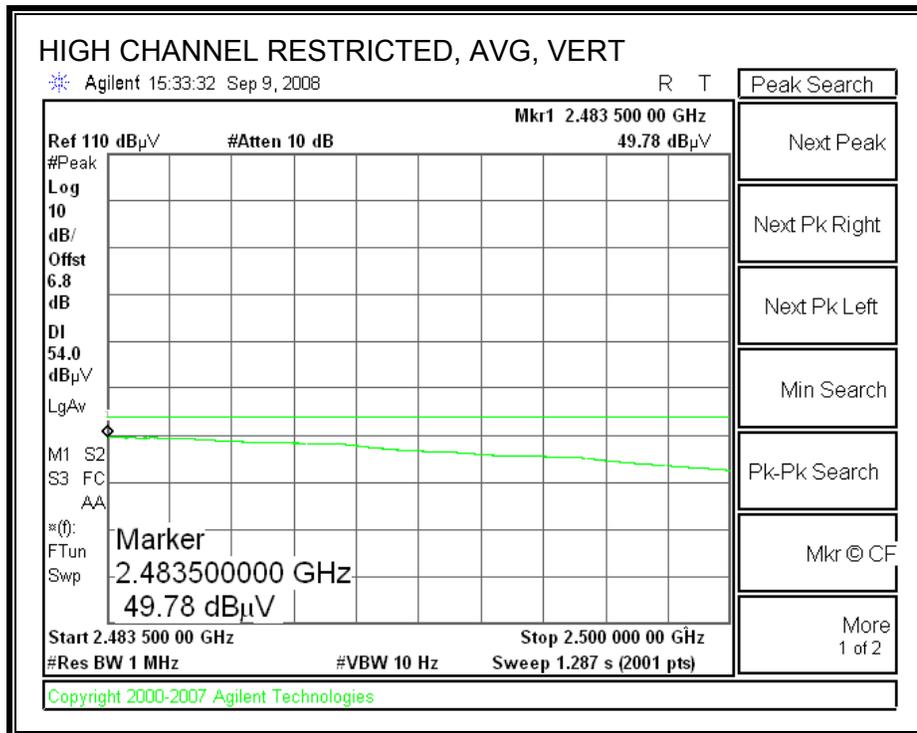
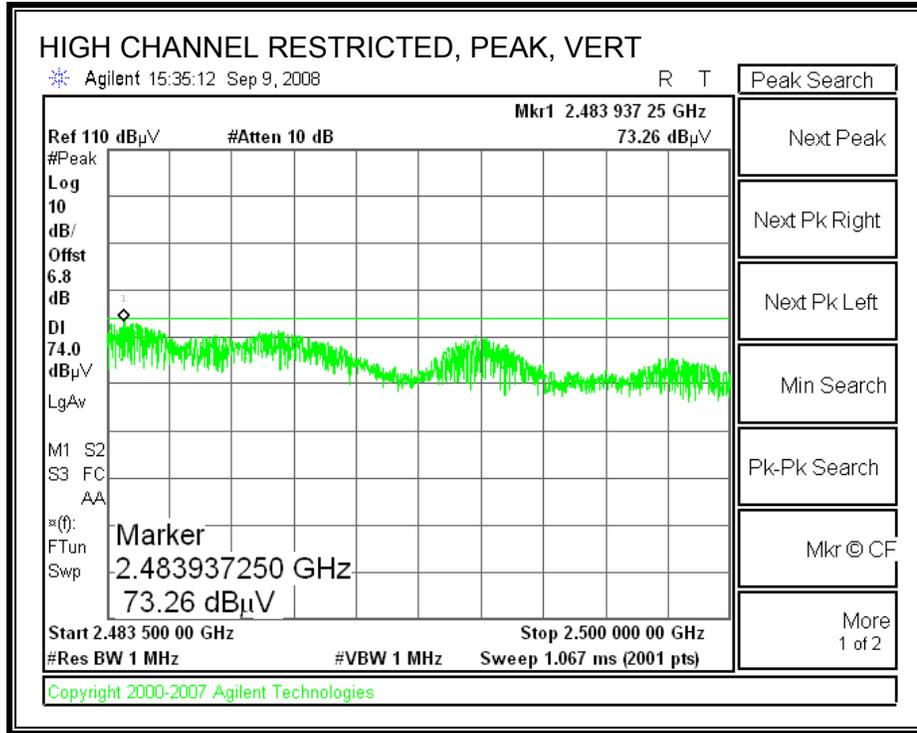
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



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



**HARMONICS AND SPURIOUS EMISSIONS**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Intel  
 Project #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_TX\_HT40 mode, Antenna B

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

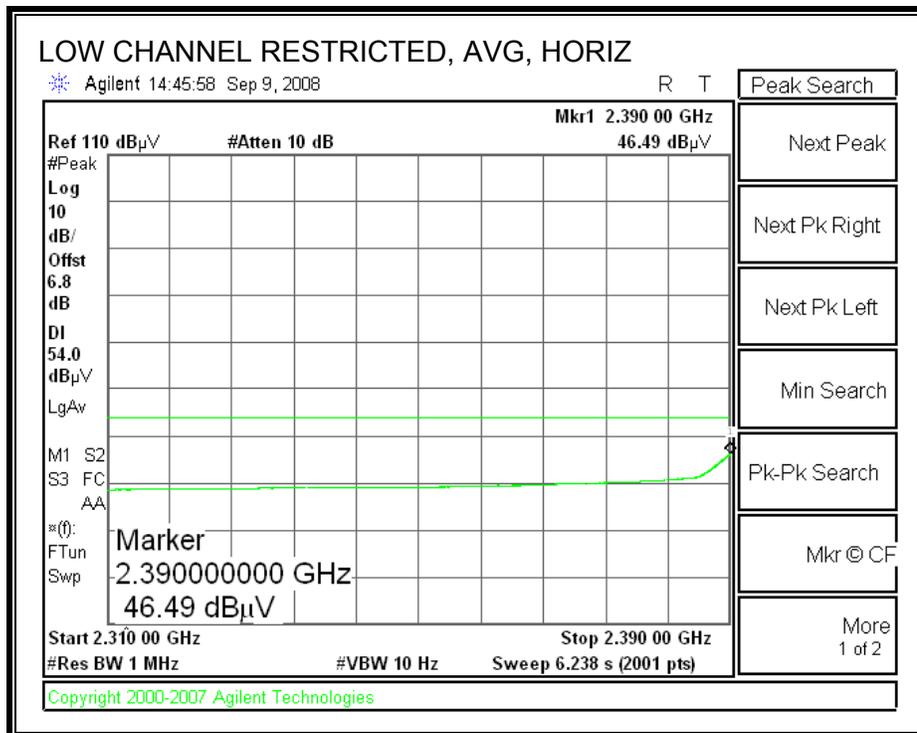
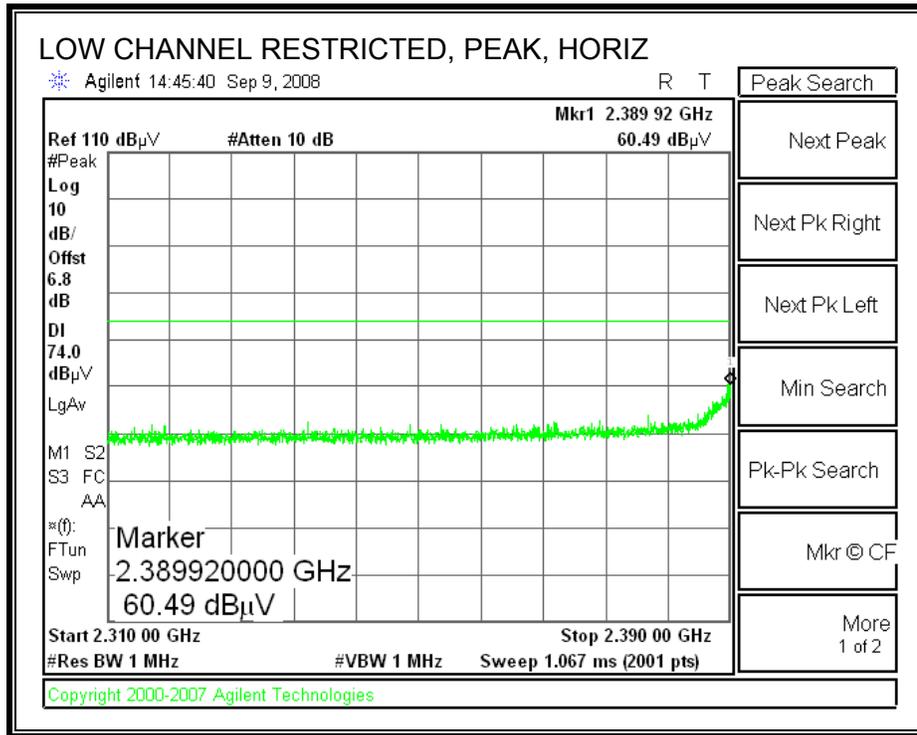
<b>2 foot cable</b>	<b>3 foot cable</b>	<b>12 foot cable</b>	<b>HPF</b>	<b>Reject Filter</b>	<b>Peak Measurements</b> RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	<b>Average Measurements</b> RBW=1MHz ; VBW=10Hz

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)
2452MHz															
4.904	3.0	43.2	29.4	33.8	3.1	-34.8	0.0	0.0	45.3	31.5	74	54	-28.7	-22.5	V
4.904	3.0	43.2	29.5	33.8	3.1	-34.8	0.0	0.0	45.3	31.7	74	54	-28.7	-22.3	H

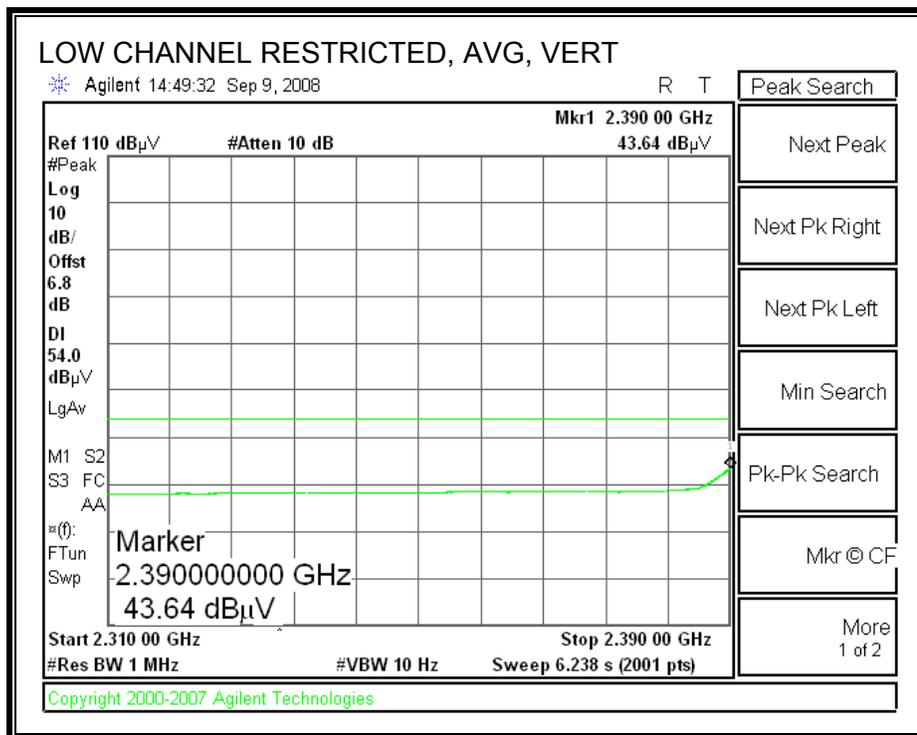
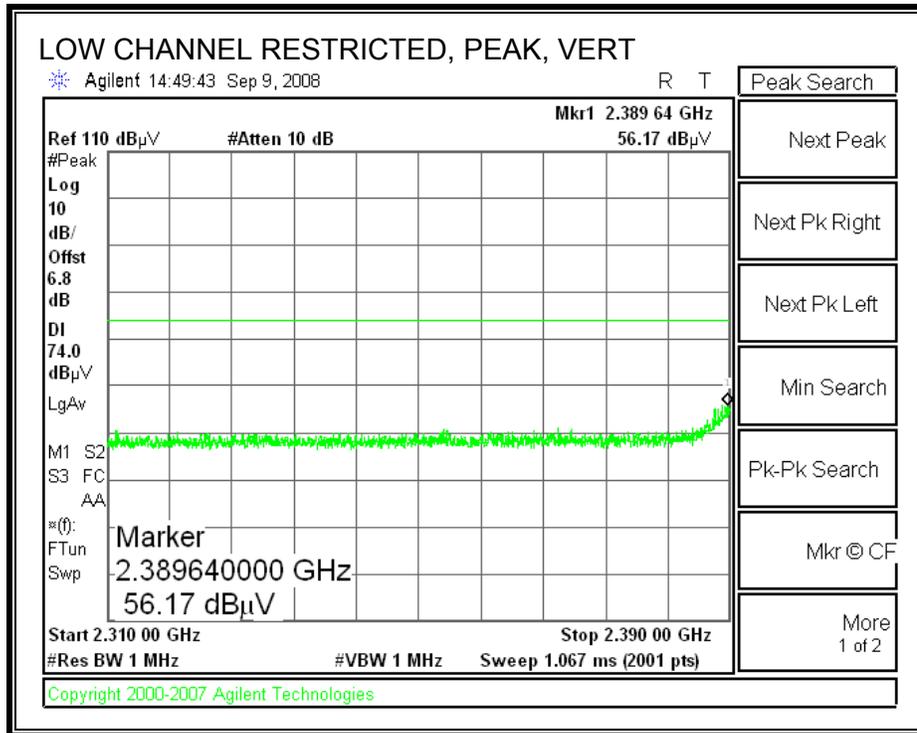
Rev. 4.12.7  
**Note: No other emissions were detected above the system noise floor.**

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		

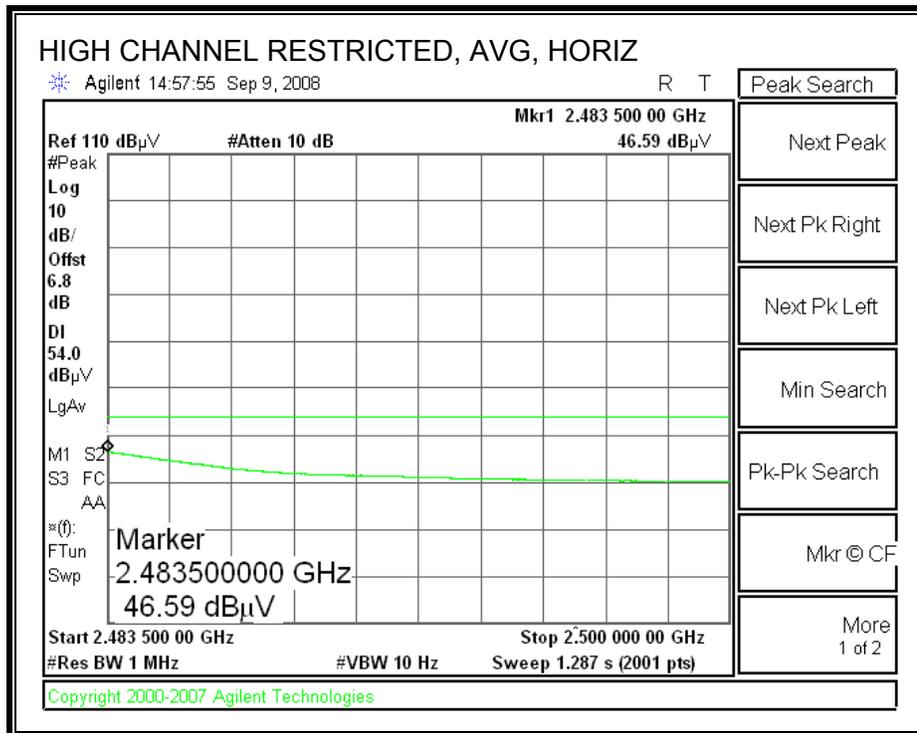
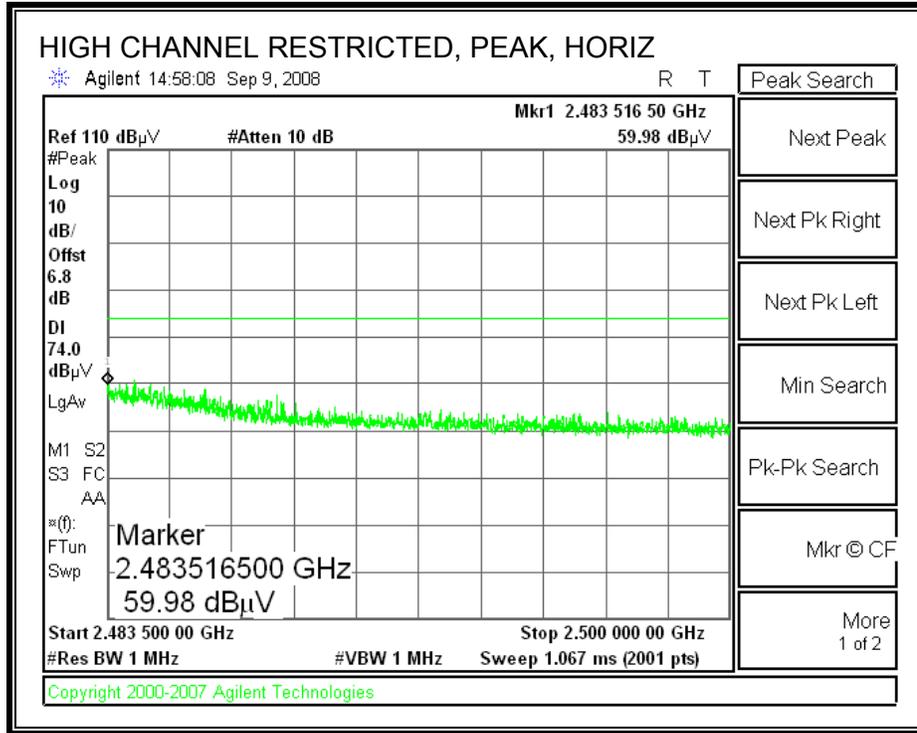
**7.2.5. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE-3TX**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



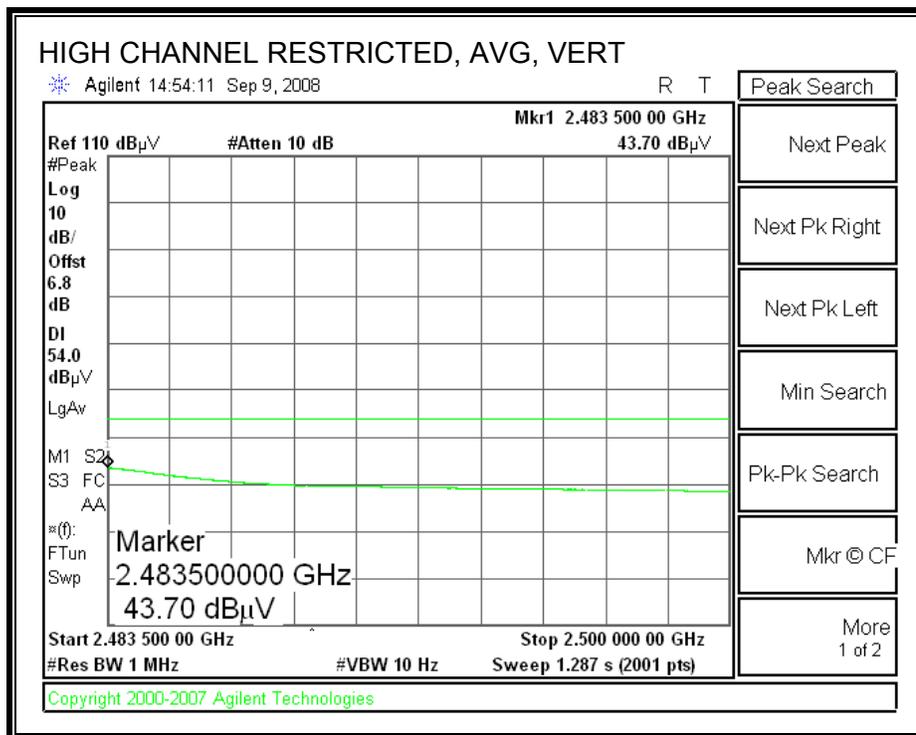
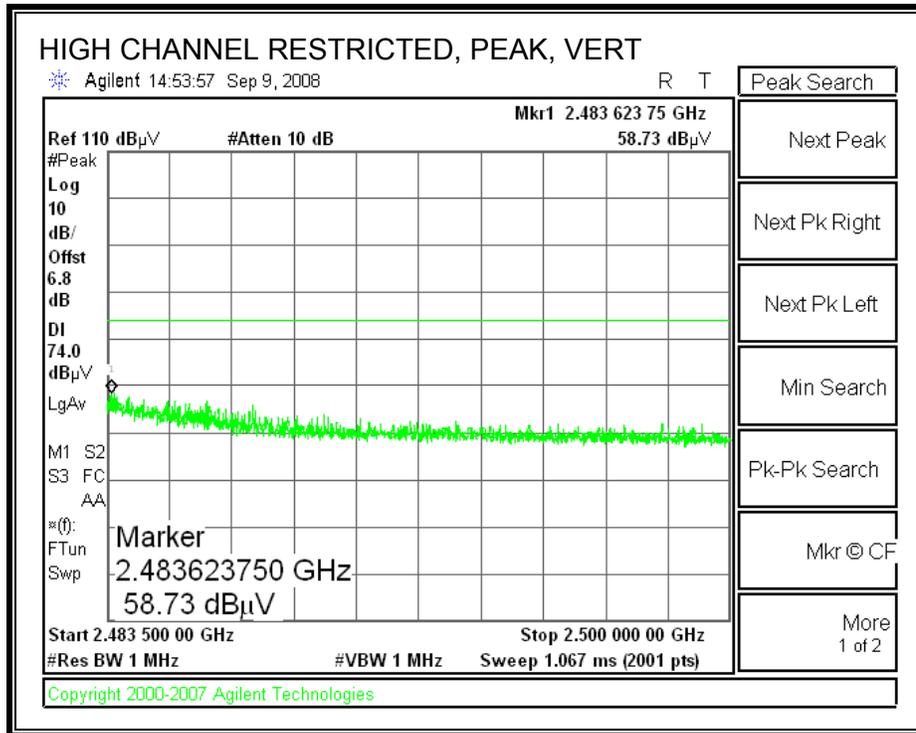
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**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 #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_2x TX\_HT20 mode, Antenna A and B

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

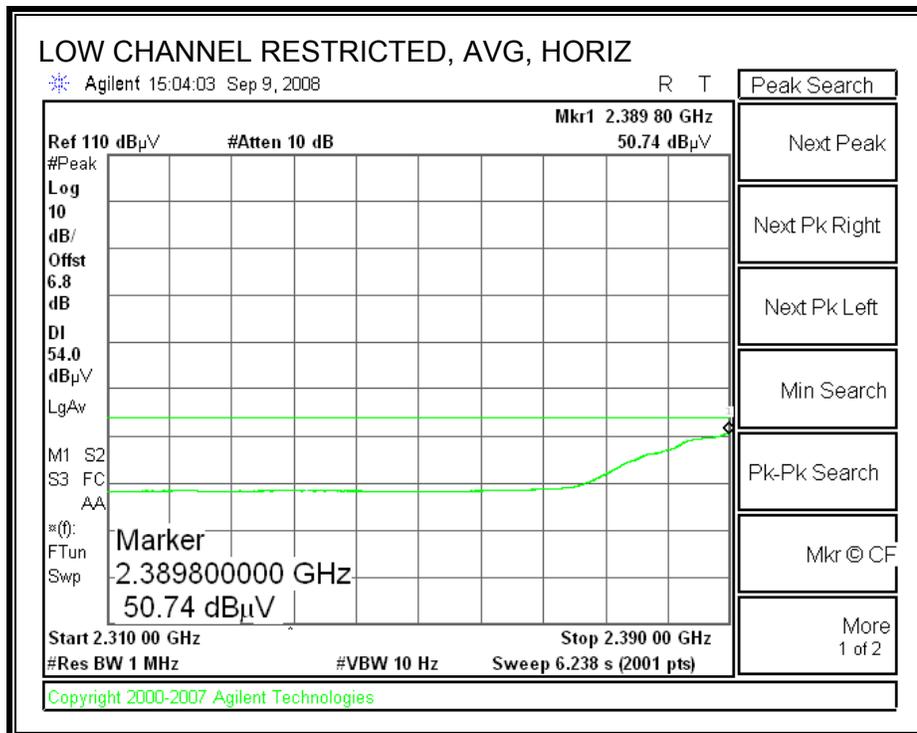
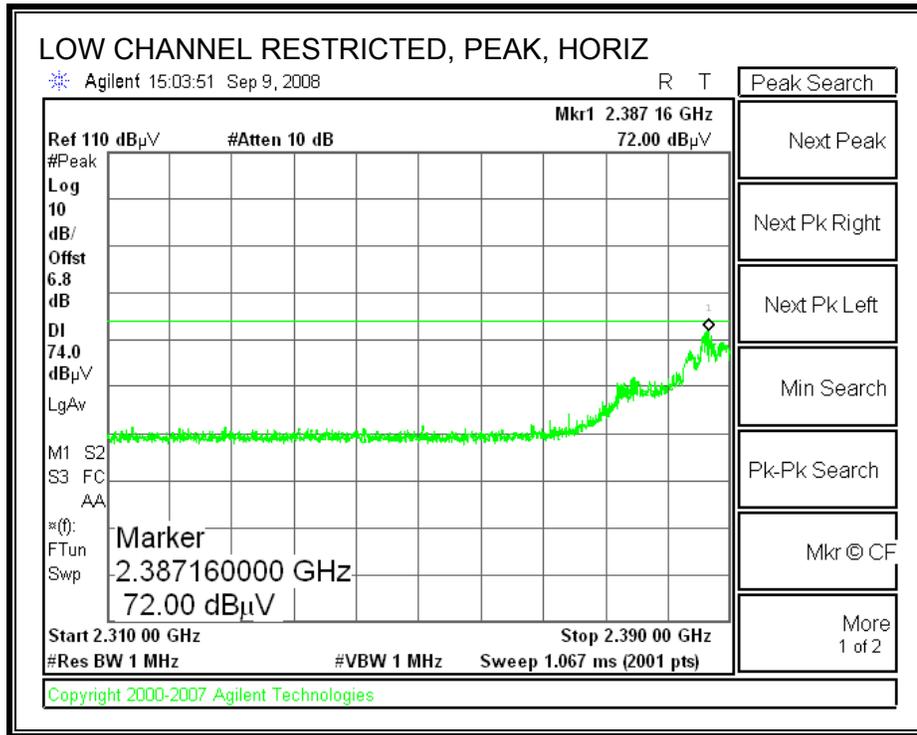
2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	
	Can 187215004	C-5m Chamber		R_001	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz

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)
2412MHz															
4.824	3.0	45.0	31.2	33.7	3.1	-34.8	0.0	0.0	47.0	33.2	74	54	-27.0	-20.8	V
4.824	3.0	44.1	30.8	33.7	3.1	-34.8	0.0	0.0	46.1	32.8	74	54	-27.9	-21.2	H

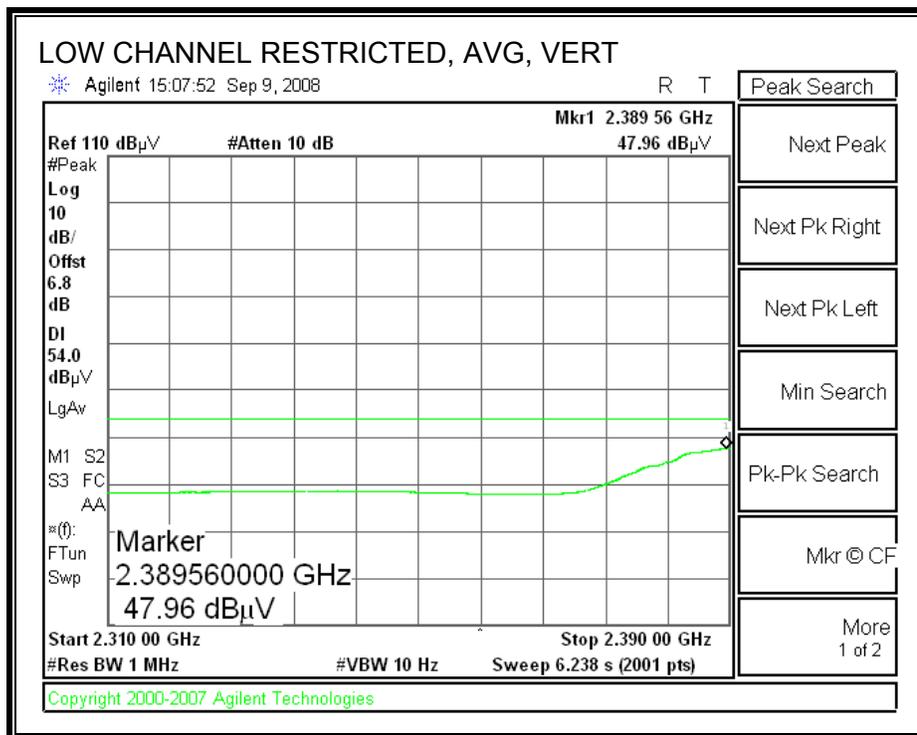
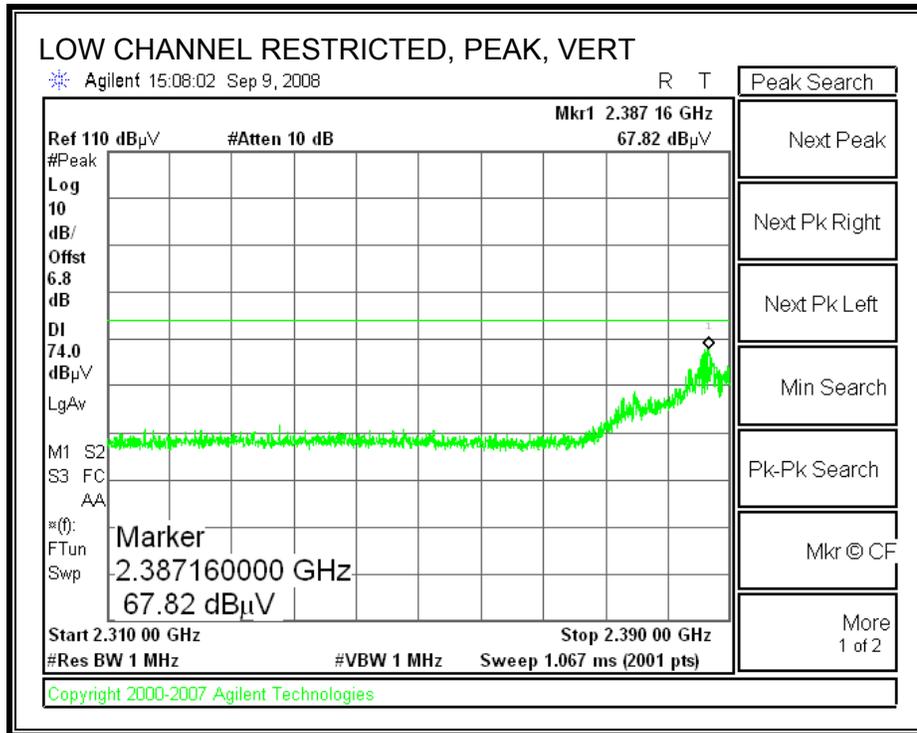
Rev. 4.12.7  
 Note: No other emissions were detected above the system noise floor.

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		

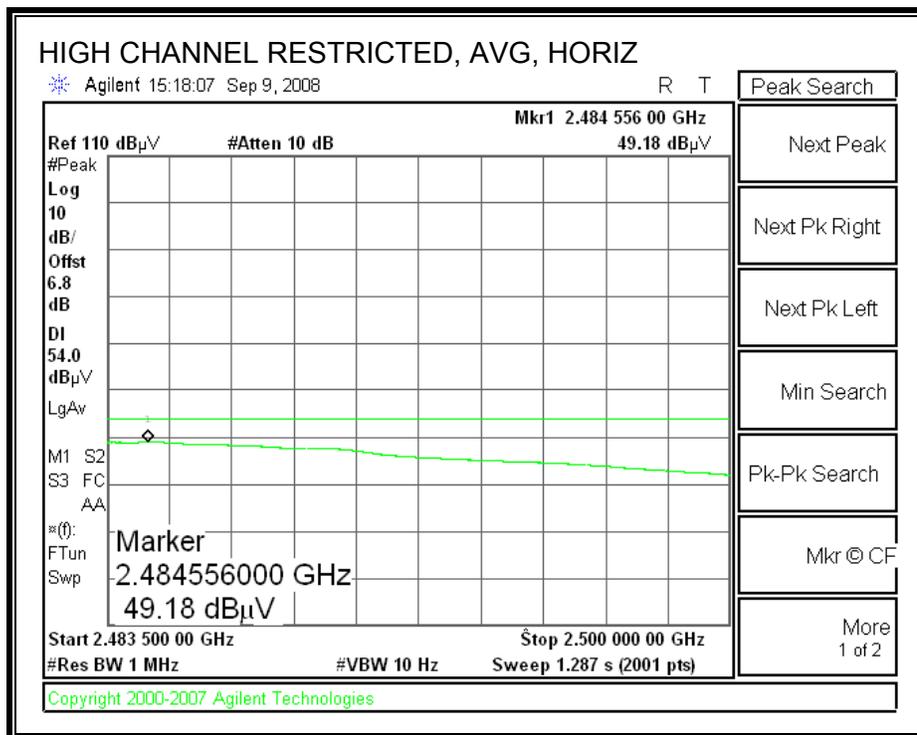
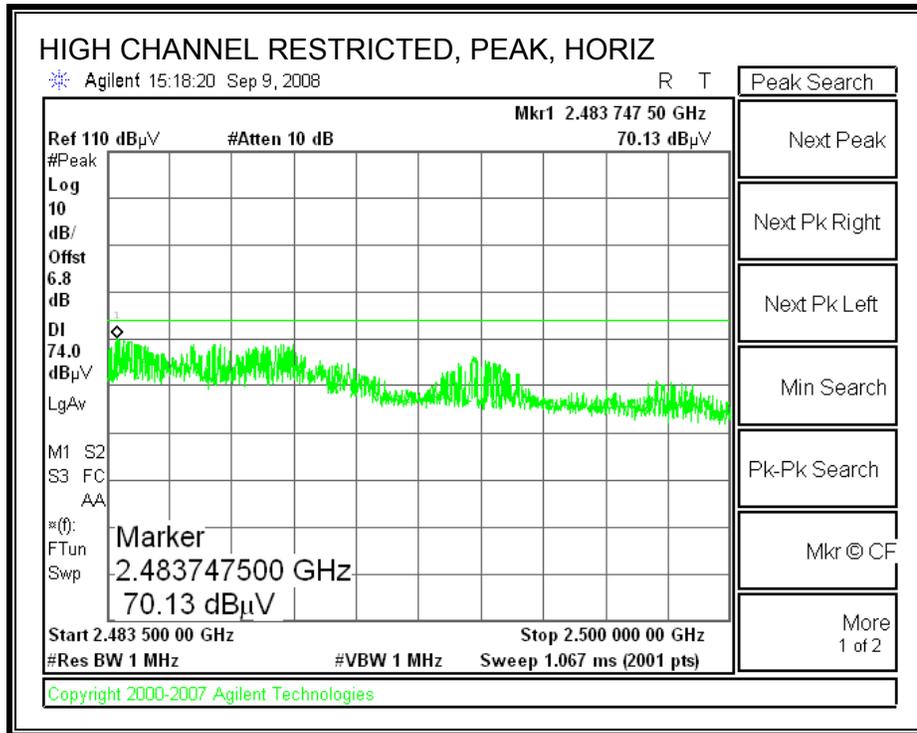
**7.2.6. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT40 MODE-3TX**  
**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



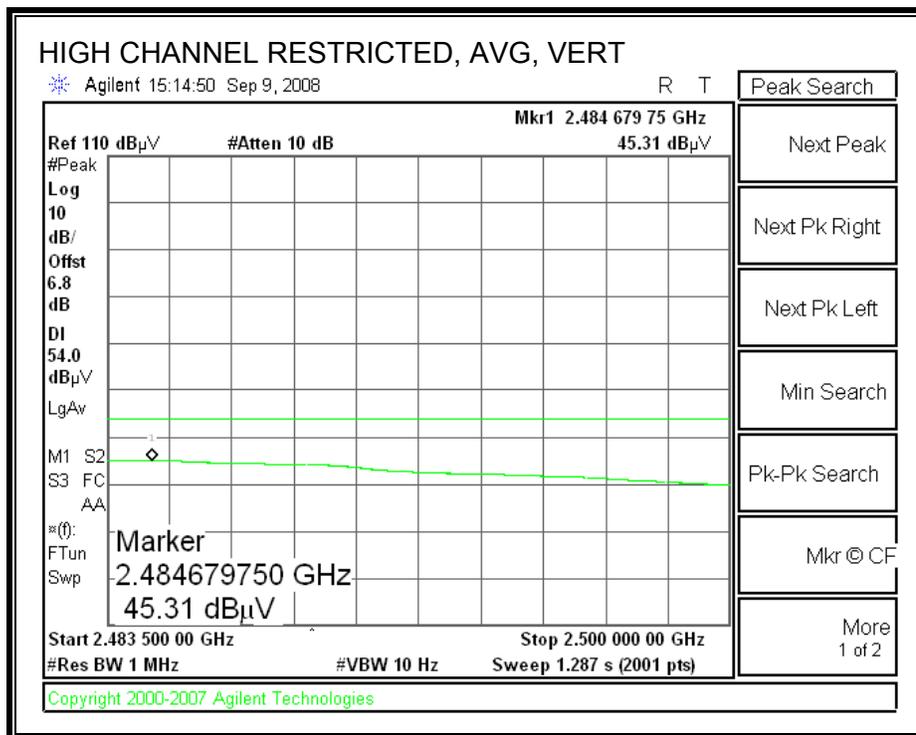
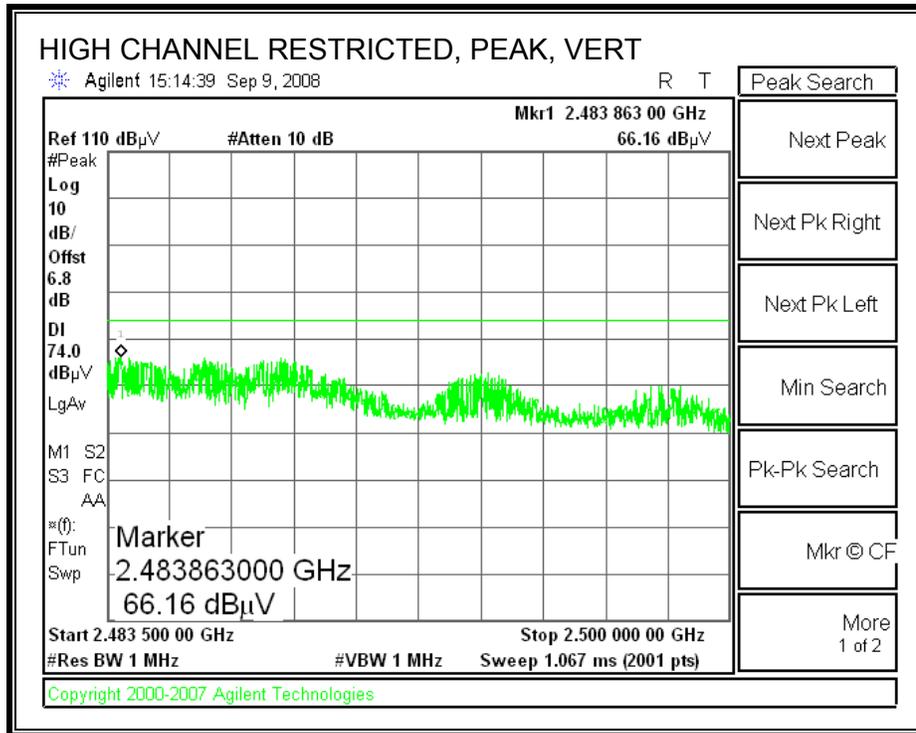
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**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 #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 2.4GHz\_3x TX\_HT20 mode, Antenna A, B, C

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifier 1-26GHz</b>	<b>Pre-amplifier 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

<b>2 foot cable</b>	<b>3 foot cable</b>	<b>12 foot cable</b>	<b>HPF</b>	<b>Reject Filter</b>	<b>Peak Measurements</b> RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	<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)
2437MHz															
4.874	3.0	45.7	31.1	33.8	3.1	-34.8	0.0	0.0	47.8	33.2	74	54	-26.2	-20.8	V
4.874	3.0	47.0	31.6	33.8	3.1	-34.8	0.0	0.0	49.1	33.7	74	54	-24.9	-20.3	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		

### 7.2.7. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE

#### HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Intel  
 Project #: 08U12063  
 Date: 9/7/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 5.8GHz\_TX\_A mode, Antenna B

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T39-T88 ARA 18-40GHz & Mixer > 40GHz	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	Average Measurements RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>5745MHz</b>															
11.490	1.0	55.2	43.4	38.6	4.7	-32.5	-9.5	0.0	56.5	44.7	74	54	-17.5	-9.3	V
11.490	1.0	53.3	41.4	38.6	4.7	-32.5	-9.5	0.0	54.6	42.7	74	54	-19.4	-11.3	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		

### 7.2.8. 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 #: 08U12063  
 Date: 9/7/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 5.8GHz\_TX\_HT20 mode, Antenna B

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T39-T88 ARA 18-40GHz & Mixer > 40GHz	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	Average Measurements RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>5745MHz</b>															
11.490	1.0	56.7	44.1	38.6	4.7	-32.5	-9.5	0.0	57.9	45.4	74	54	-16.1	-8.6	V
11.490	1.0	52.9	41.4	38.6	4.7	-32.5	-9.5	0.0	54.1	42.7	74	54	-19.9	-11.3	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		

## 7.2.9. 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 #: 08U12063  
 Date: 9/7/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 5.8GHz\_TX\_HT40 mode, Antenna B

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T39-T88 ARA 18-40GHz & Mixer > 40GHz	FCC 15.205

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	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>5755MHz</b>															
11.510	1.0	52.6	42.5	38.6	4.8	-32.5	-9.5	0.0	53.9	43.8	74	54	-20.1	-10.2	V
11.510	1.0	50.2	40.5	38.6	4.8	-32.5	-9.5	0.0	51.5	41.8	74	54	-22.5	-12.2	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		

## 7.2.10. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE-2TX

### HARMONICS AND SPURIOUS EMISSIONS

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Intel  
 Project #: 08U12063  
 Date: 9/7/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: 5.8GHz\_2x TX\_HT20 mode, Antenna B, C

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B	T88 Miteq 26-40GHz	T39-T88 ARA 18-40GHz & Mixer > 40GHz	FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
	Can 187215004	C-5m Chamber		R_001	Average Measurements RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
<b>5745MHz</b>															
11.490	1.0	60.0	48.3	38.6	4.7	-32.5	-9.5	0.0	61.3	49.5	74	54	-12.7	-4.5	V
11.490	1.0	56.9	44.5	38.6	4.7	-32.5	-9.5	0.0	58.2	45.7	74	54	-15.8	-8.3	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		

### 7.3. RECEIVER ABOVE 1 GHz

#### 7.3.1. RECEIVER ABOVE 1 GHz FOR THE 2.4 GHz BAND (WORST CASE)

High Frequency Measurement															
Compliance Certification Services, Fremont 5m Chamber															
Company: Intel															
Project #: 08U12063															
Date: 9/5/2008															
Test Engineer: Devin Chang															
Configuration: EUT Only															
Mode: RX ( Worst Case ), 2.4GHz Band															
<b>Test Equipment:</b>															
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit			
T73; S/N: 6717 @3m			T34 HP 8449B									FCC 15.209			
Hi Frequency Cables															
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			
			Can 187215004			C-5m Chamber									
<div style="text-align: right;"> <b>Peak Measurements</b>                      RBW=VBW=1MHz  <b>Average Measurements</b>                      RBW=1MHz ; VBW=10Hz                 </div>															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.322	3.0	61.6	40.6	26.6	1.8	-37.8	0.0	0.0	52.1	31.1	74	54	-21.9	-22.9	V
1.598	3.0	64.4	40.0	27.3	1.9	-37.4	0.0	0.0	56.2	31.7	74	54	-17.8	-22.3	V
6.432	3.0	45.3	38.5	35.3	3.5	-34.5	0.0	0.0	49.7	42.9	74	54	-24.3	-11.1	V
1.350	3.0	50.4	42.3	26.7	1.8	-37.8	0.0	0.0	41.1	32.9	74	54	-32.9	-21.1	H
1.598	3.0	54.9	35.4	27.3	1.9	-37.4	0.0	0.0	46.6	27.2	74	54	-27.4	-26.8	H
6.432	3.0	42.4	31.9	35.3	3.5	-34.5	0.0	0.0	46.8	36.3	74	54	-27.2	-17.7	H
															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		

### 7.3.2. RECEIVER ABOVE 1 GHz FOR THE 5.8 GHz BAND (WORST CASE)

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Intel  
 Project #: 08U12063  
 Date: 9/5/2008  
 Test Engineer: Devin Chang  
 Configuration: EUT Only  
 Mode: RX ( Worst Case ), 5.8GHz Band

**Test Equipment:**

<b>Horn 1-18GHz</b>	<b>Pre-amplifer 1-26GHz</b>	<b>Pre-amplifer 26-40GHz</b>	<b>Horn &gt; 18GHz</b>	<b>Limit</b>
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

<b>2 foot cable</b>	<b>3 foot cable</b>	<b>12 foot cable</b>	<b>HPF</b>	<b>Reject Filter</b>	<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz
	Can 187215004	C-5m Chamber			

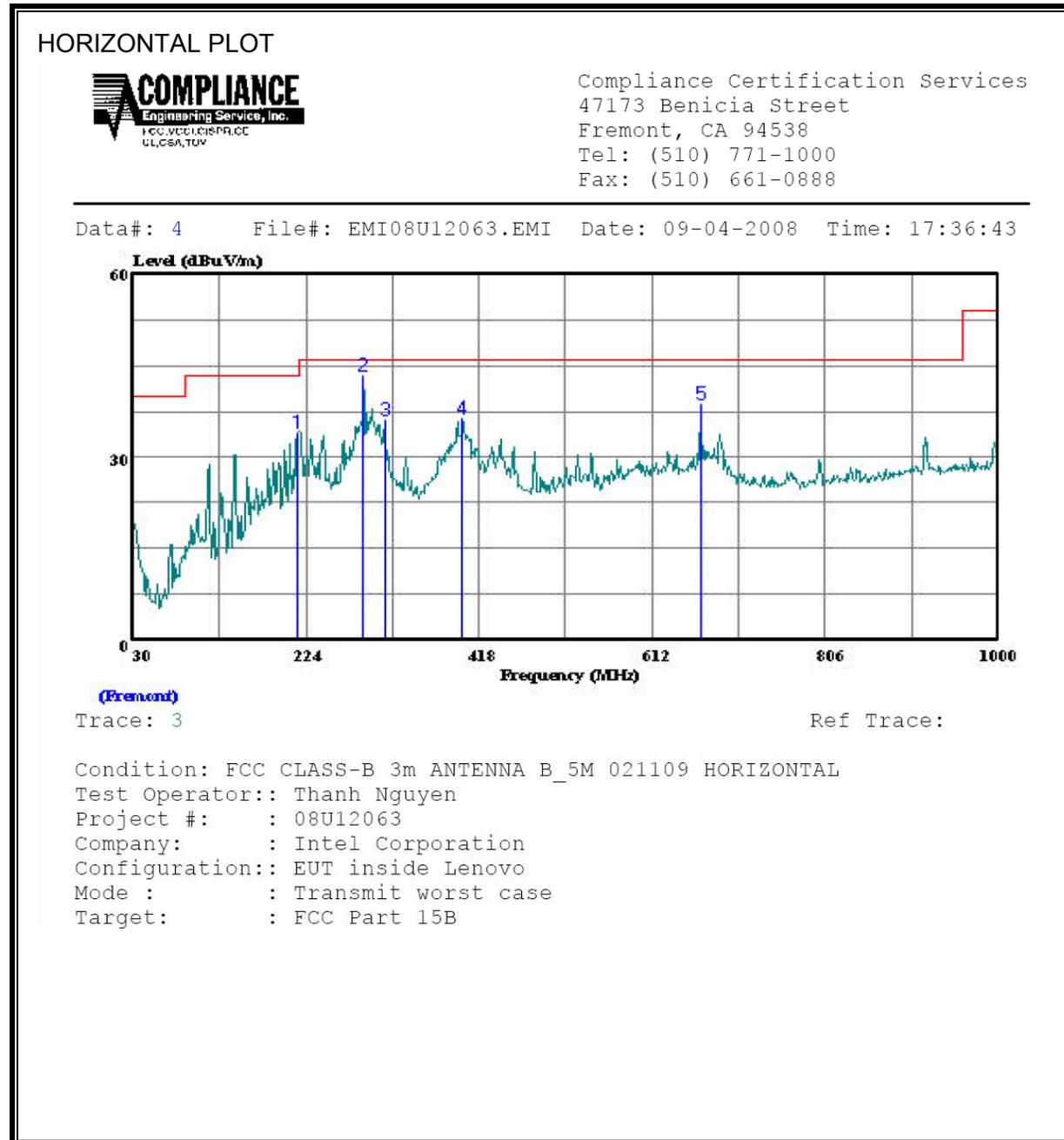
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.020	3.0	51.1	44.2	25.8	1.6	-38.2	0.0	0.0	40.2	33.4	74	54	-33.8	-20.6	V
1.650	3.0	49.2	41.4	27.5	1.9	-37.4	0.0	0.0	41.2	33.4	74	54	-32.8	-20.6	V
7.660	3.0	45.4	41.1	36.4	3.9	-34.0	0.0	0.0	51.7	47.4	74	54	-22.3	-6.6	V
1.020	3.0	52.2	46.9	25.8	1.6	-38.2	0.0	0.0	41.3	36.0	74	54	-32.7	-18.0	H
1.350	3.0	49.2	41.9	26.7	1.8	-37.8	0.0	0.0	39.9	32.6	74	54	-34.1	-21.4	H
1.992	3.0	56.1	33.5	28.4	2.1	-36.9	0.0	0.0	49.7	27.0	74	54	-24.3	-27.0	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		

### 7.4. WORST-CASE BELOW 1 GHz

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



HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	215.270	51.50	-17.47	34.03	43.50	-9.47	Peak
2	288.020	59.33	-16.05	43.28	46.00	-2.72	Peak
3	312.270	51.17	-15.18	35.99	46.00	-10.01	Peak
4	399.570	49.00	-12.69	36.31	46.00	-9.69	Peak
5	666.320	45.67	-7.08	38.59	46.00	-7.41	Peak

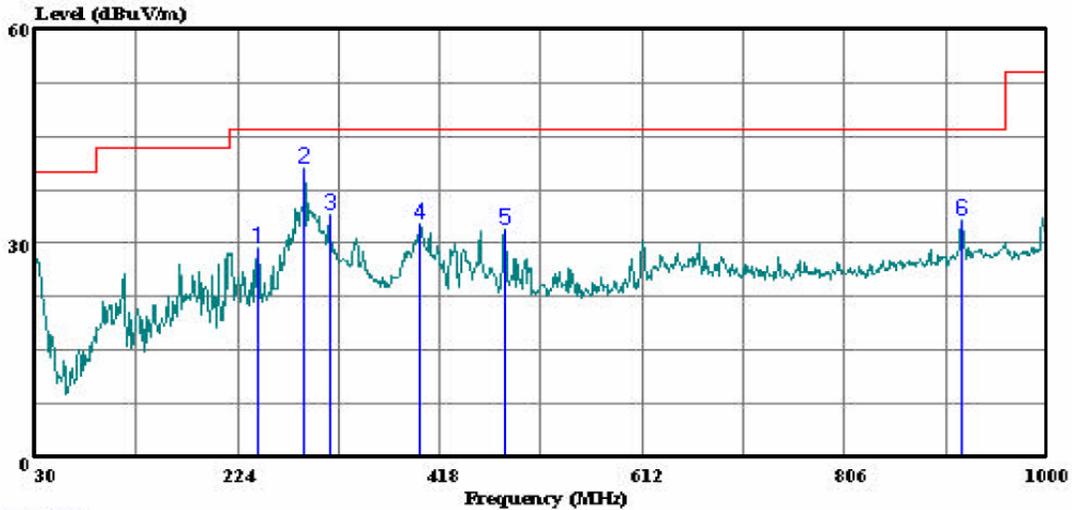
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



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

Data#: 2 File#: EMI08U12063.EMI Date: 09-04-2008 Time: 17:20:08



(Fremont)

Trace: 1

Ref Trace:

Condition: FCC CLASS-B 3m ANTENNA B\_5M 021109 VERTICAL  
Test Operator:: Thanh Nguyen  
Project #: : 08U12063  
Company: : Intel Corporation  
Configuration:: EUT inside Lenovo  
Mode : : Transmit worst case  
Target: : FCC Part 15B

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	243.400	47.17	-17.75	29.42	46.00	-16.58	Peak
2	288.020	56.67	-16.05	40.62	46.00	-5.38	Peak
3	312.270	49.33	-15.18	34.15	46.00	-11.85	Peak
4	399.570	45.50	-12.69	32.81	46.00	-13.19	Peak
5	481.050	42.17	-10.34	31.83	46.00	-14.17	Peak
6	917.550	35.17	-1.93	33.23	46.00	-12.77	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	56 to 46
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

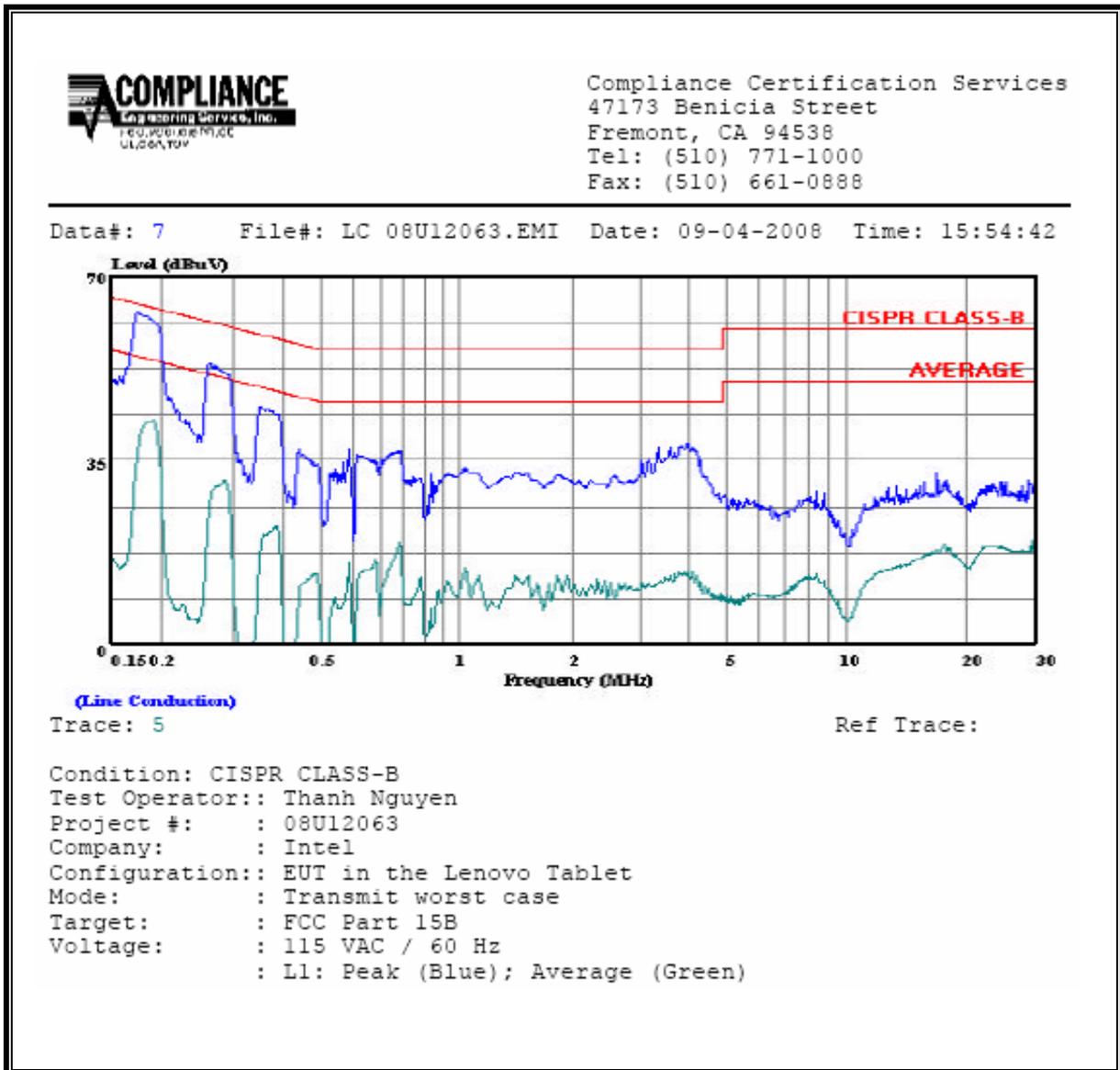
ANSI C63.4

### RESULTS

#### 6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Cross	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	63.37	--	42.63	0.00	64.77	54.77	-1.40	-12.14	L1
0.26	53.44	--	31.28	0.00	61.34	51.34	-7.90	-20.06	L1
4.09	38.20	--	13.60	0.00	56.00	46.00	-17.80	-32.40	L1
0.18	63.91	--	43.48	0.00	64.67	54.67	-0.76	-11.19	L2
0.26	52.77	--	31.96	0.00	61.34	51.34	-8.57	-19.38	L2
3.33	37.88	--	13.93	0.00	56.00	46.00	-18.12	-32.07	L2
6 Worst Data									

**LINE 1 RESULTS**

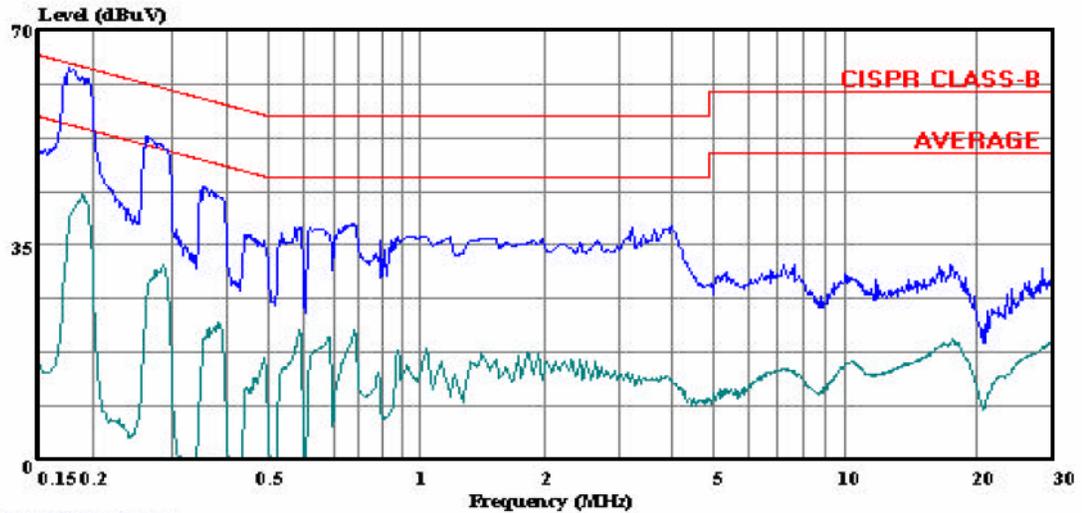


**LINE 2 RESULTS**



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

Data#: 14 File#: LC 08U12063.EMI Date: 09-04-2008 Time: 16:08:31



(Line Conduction)

Trace: 12

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator:: Thanh Nguyen  
Project #: : 08U12063  
Company: : Intel  
Configuration:: EUT in the Lenovo Tablet  
Mode: : Transmit worst case  
Target: : FCC Part 15B  
Voltage: : 115 VAC / 60 Hz  
: L2: Peak (Blue); Average (Green)