



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 8**

**CERTIFICATION TEST REPORT  
CLASS II PERMISSIVE CHANGE**

**FOR**

**802.11 a/b/g/n 3X3 MIMO WLAN + BT Mini Card inside a host laptop**

**MODEL NUMBER: BCM94331CSAX**

**FCC ID: QDS-BRCM1062  
IC: 4324A-BRCM1062**

**REPORT NUMBER: 12U14483-1, Revision A**

**ISSUE DATE: AUGUST 2, 2012**

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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>
--	07/17/2012	Original	T. LEE
A	08/02/12	Updated model number	A. Zaffar

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE, INC.  
1 INFINITE LOOP  
CUPERTINO, CA, 95014, U.S.A.

**EUT DESCRIPTION:** 802.11 a/b/g/n 3X3 MIMO WLAN + BT Mini Card inside a host laptop

**MODEL:** BCM94331CSAX

**SERIAL NUMBER:** 630

**DATE TESTED:** JULY 3~ 14, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	PASS
INDUSTRY CANADA RSS-GEN Issue 3	PASS

UL 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 UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

Tested By:



TIM LEE  
STAFF ENGINEER  
UL CCS

TOM CHEN  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

## 3. FACILITIES AND ACCREDITATION

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

UL 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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 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/g/n WLAN + Bluetooth PCI-E Custom Combination Card.

The radio module is manufactured by Broadcom.

### 5.2. MAXIMUM OUTPUT POWER

Please refer to operational description. Refer to original report number "11U14154-8A FCC IC DTS" for exact output power values and for all antenna port results.

### 5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The change filed under this application has the following changes.

- Adding a certificated module in a portable host

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

	604-0131 Wi-Fi1	604-0131 Wi-Fi2	604-0131 Wi-Fi3 & Bluetooth
	Peak Gain (includes cable loss)	Peak Gain (includes cable loss)	Peak Gain (includes cable loss)
Freq [GHz]			
2.4 – 2.484	2.47	2.64	4.82
5.15 – 5.25	4.18	4.22	4.63
5.25 – 5.35	3.35	3.44	3.01
5.50 – 5.70	3.32	2.41	4.63
5.725 – 5.85	3.56	3.68	4.31

Antenna to module Mapping

WF1 - ch2

WF2 - ch0

WF3 - ch1

### 5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 5.106.98.42.

The test utility software used during testing was BCM Internal, rev. 5.106.RC98.42.

## 5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Only the 802.11b and 802.11n modes at 2.4GHz was tested since that was considered worst case. Only 802.11n, HT20 and 802.11n, HT40 modes at 5 GHz was tested since that was considered worst case.

Based on the manufacturer's attestation that the nominal output power is reduced as the data rate increases, the data rates tested represent the highest power and worst-case with respect to EMC performance.

The following worst-case data rates were used.

### For 2.4 GHz Band:

802.11b: 1 Mb/s.

802.11n 20MHz: MCS0.

### For 5.8 GHz Band:

802.11n 20MHz: MCS0.

802.11n 40MHz: MCS0

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC ADAPTER	Apple	PA-1850-7A1	1674

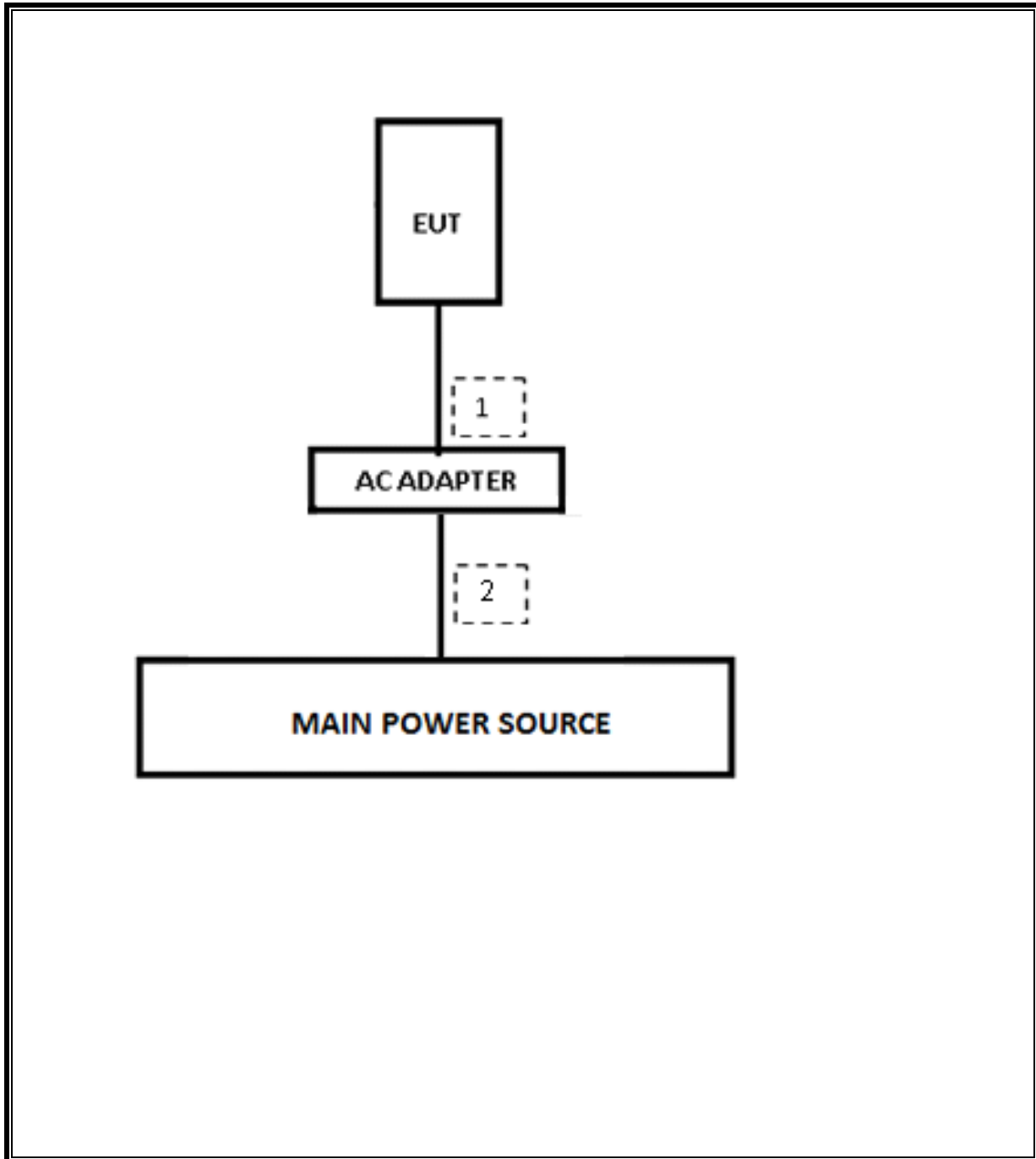
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC JACK	UN-SHELDDED	1.5m	
2	AC	1	AC	UN-SHELDDED	1.5m	N/A



**TEST SETUP**

**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	C01052	07/14/13
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/13
Horn Antenna, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/13
Horn Antenna, 40 GHz	ARA	MWH-2640/B	C00981	05/10/13
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	03/14/13
Reject Filter, 2.0-2.9 GHz	Micro-Tronics	BRM50702	N02684	CNR
High Pass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	04/09/13
Peak Power Meter	Agilent	N1911A	1260847C	08/04/12
Peak Power Sensor	Agilent	E9323A	1244073F	08/04/12
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
EMI Test Receiver, 30MHz	R & S	ESHS 20	N02396	08/19/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/13/12

## 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.

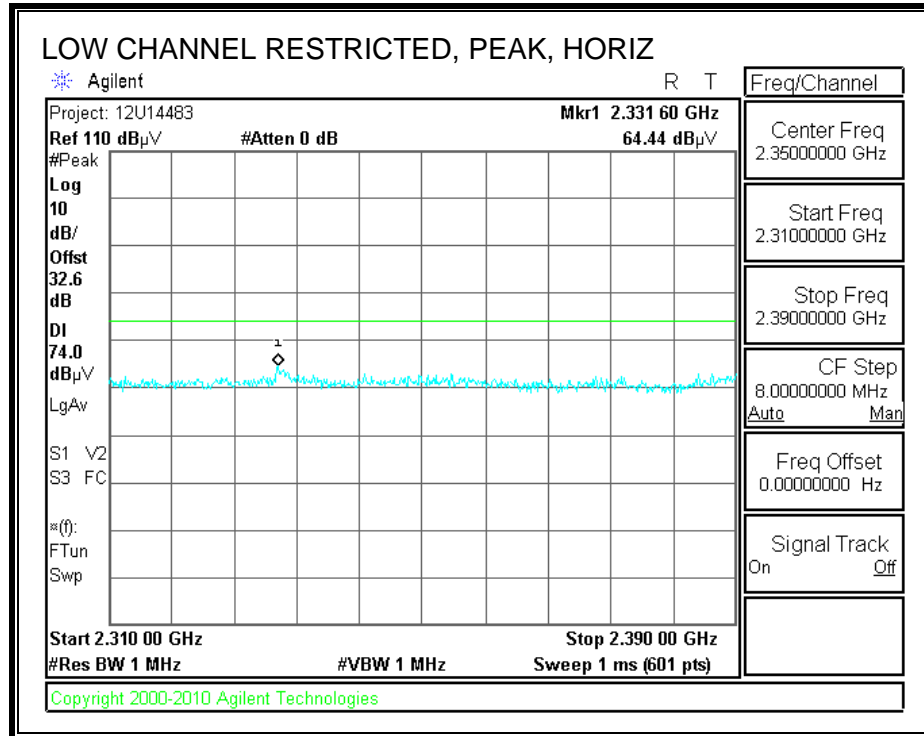
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

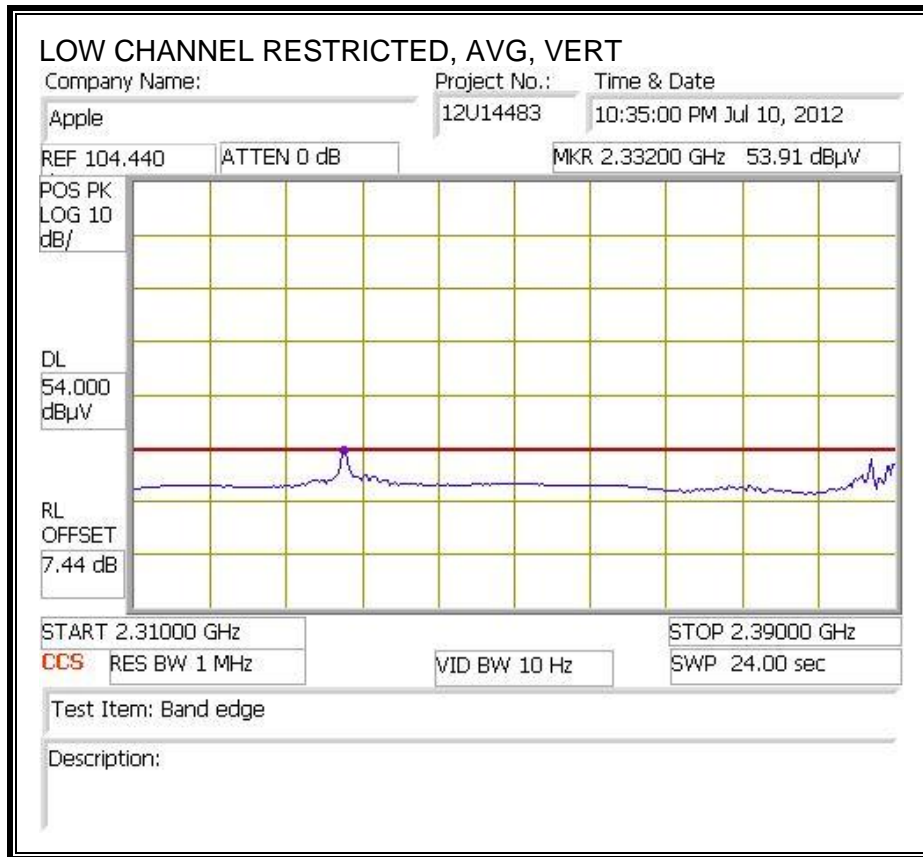
### 7.2.1. TX ABOVE 1 GHz, 802.11b CDD 3TX MODE IN THE 2.4 GHz BAND

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

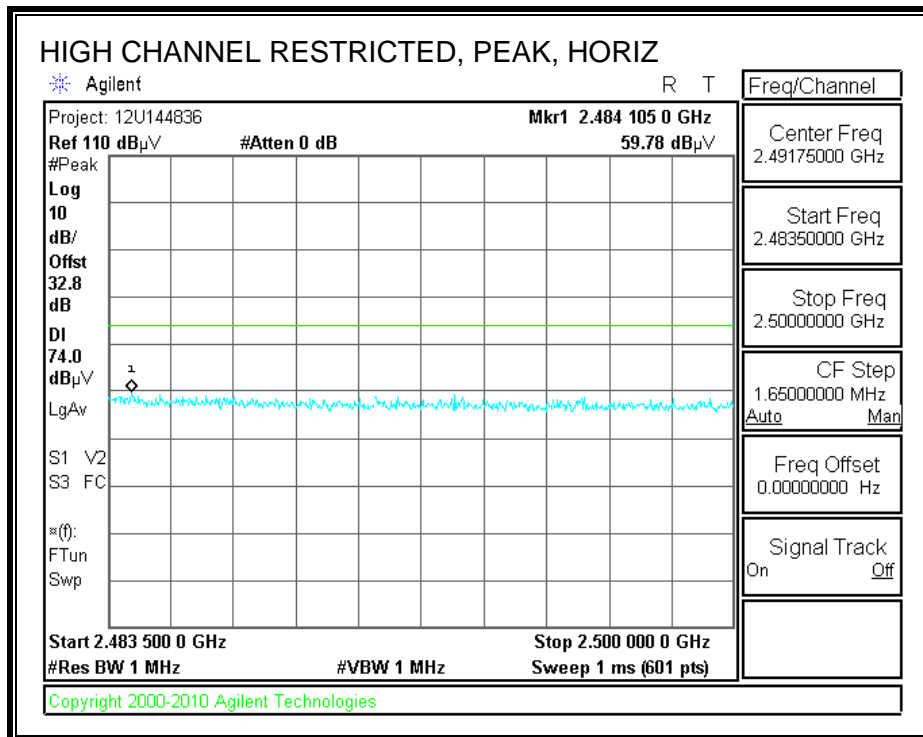




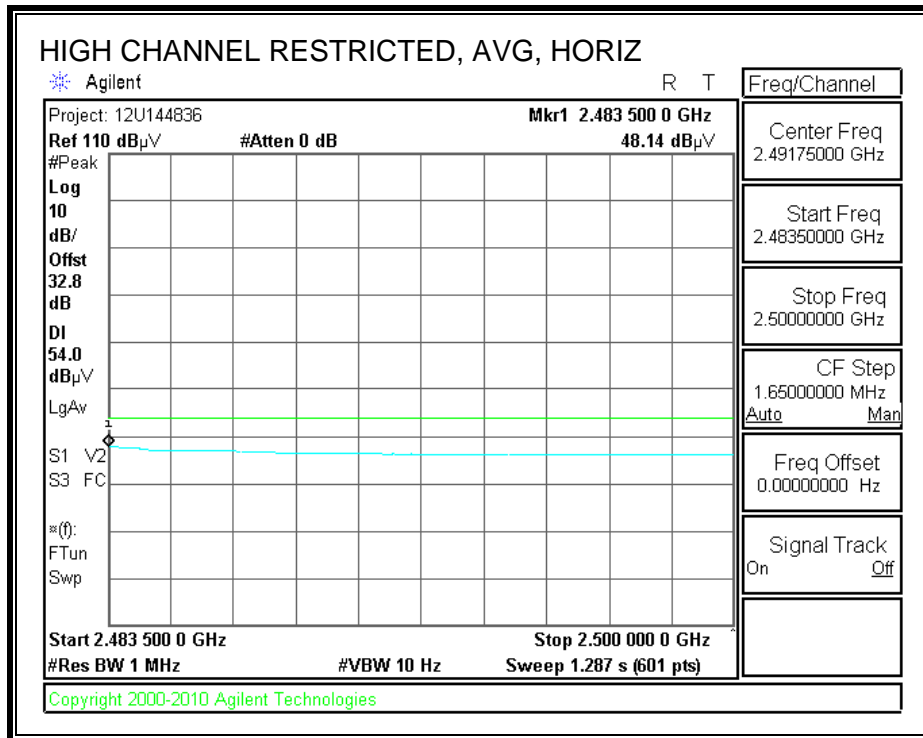




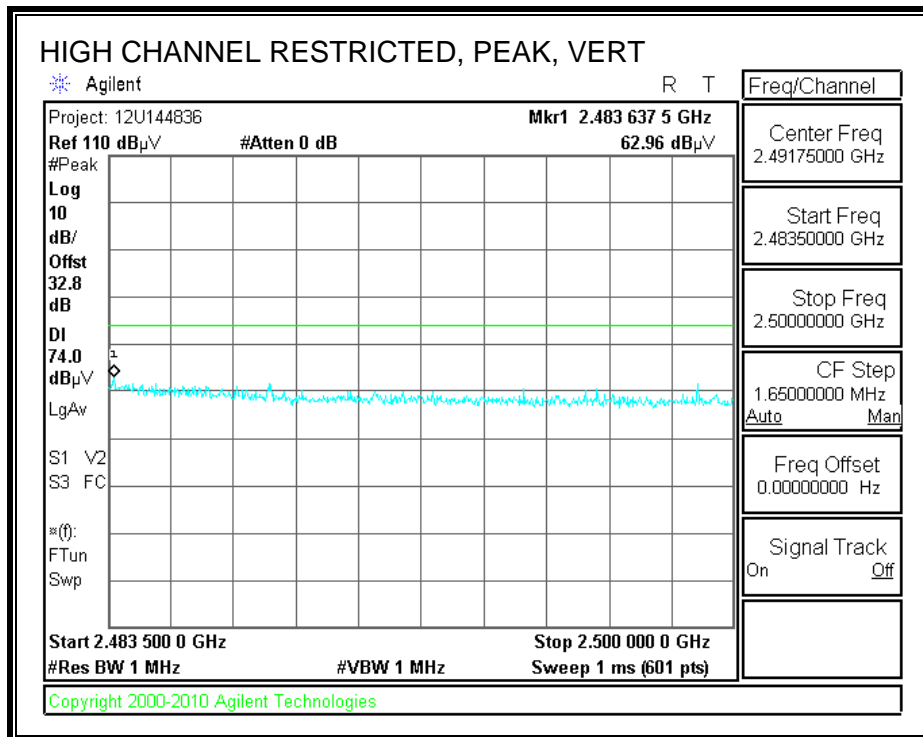
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

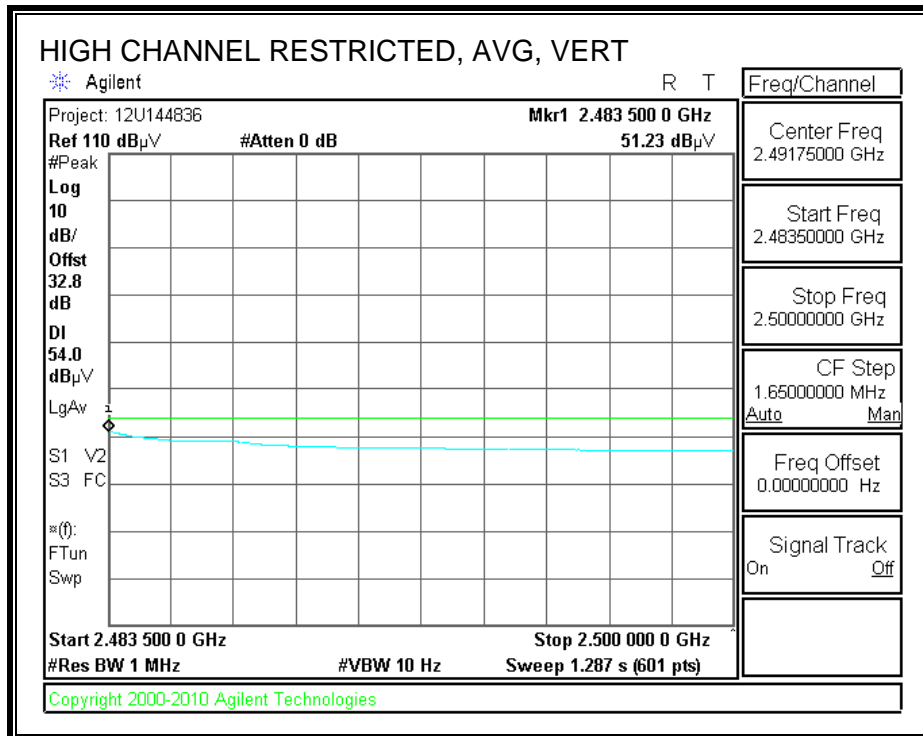






**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



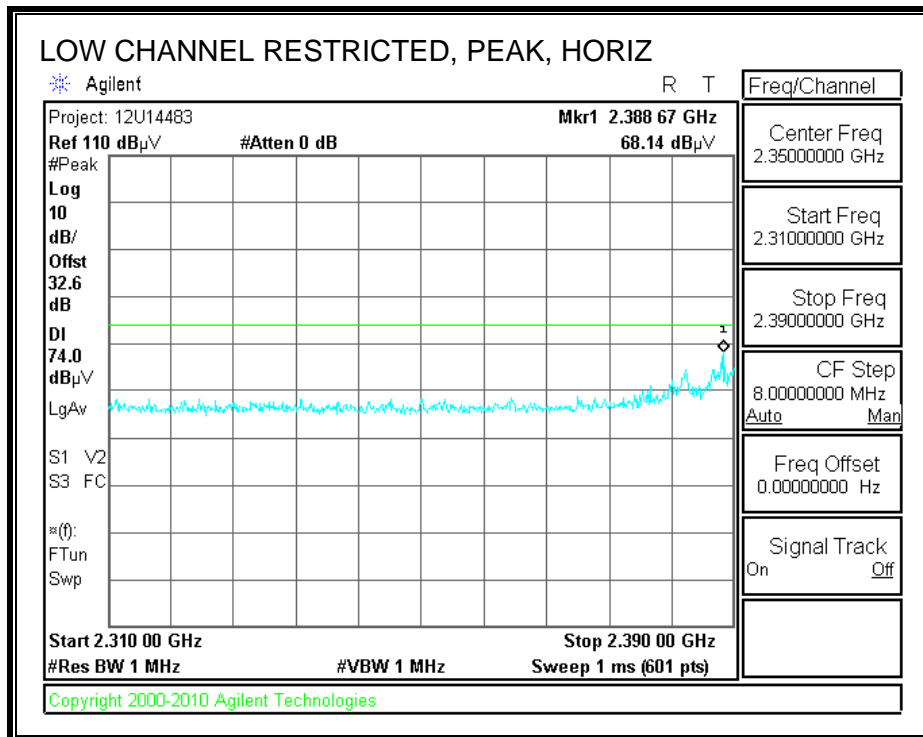


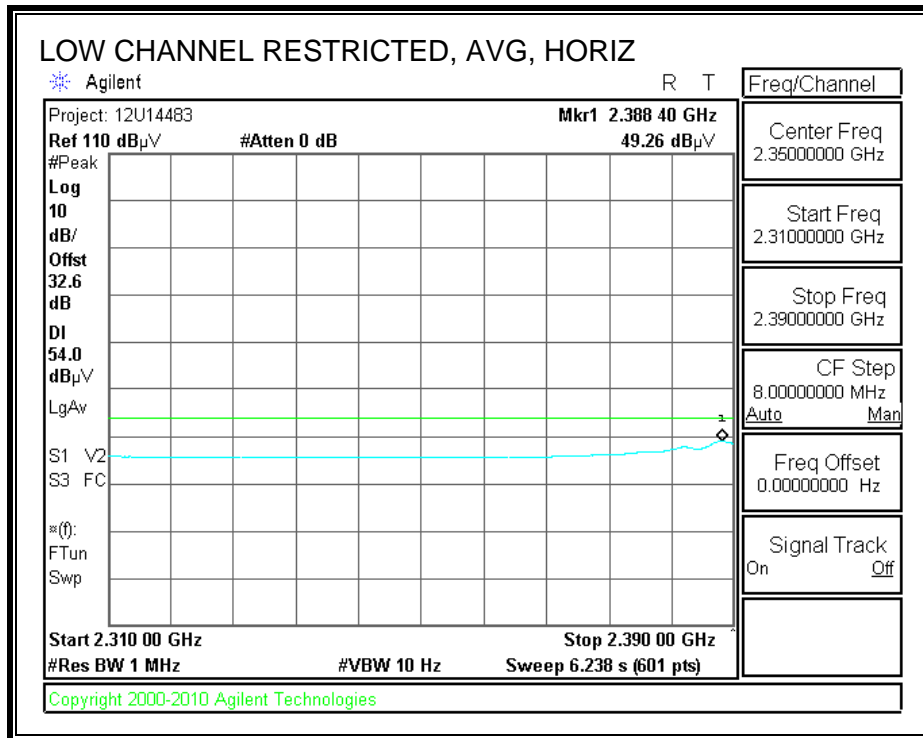
**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		TomChen											
Date:		07/12/12											
Project #:		12U14483											
Company:		Apple Inc.											
Test Target:		FCC Class B											
Mode Oper:		802.11b 3TX CDD											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/Q/P	
<b>2412MHz b mode</b>													
4.824	3.0	41.3	33.1	6.8	-34.1	0.0	0.0	47.1	74.0	-26.9	H	P	
4.824	3.0	35.6	33.1	6.8	-34.1	0.0	0.0	41.5	54.0	-12.5	H	A	
4.824	3.0	48.6	33.1	6.8	-34.1	0.0	0.0	54.5	74.0	-19.5	V	P	
4.824	3.0	45.3	33.1	6.8	-34.1	0.0	0.0	51.2	54.0	-2.8	V	A	
<b>2437MHz b mode</b>													
4.874	3.0	45.8	33.2	6.8	-34.0	0.0	0.0	51.7	74.0	-22.3	V	P	
4.874	3.0	41.9	33.2	6.8	-34.0	0.0	0.0	47.8	54.0	-6.2	V	A	
4.874	3.0	40.0	33.2	6.8	-34.0	0.0	0.0	45.9	74.0	-28.1	H	P	
4.874	3.0	32.7	33.2	6.8	-34.0	0.0	0.0	38.6	54.0	-15.4	H	A	
<b>2462MHz b mode</b>													
4.924	3.0	39.2	33.2	6.8	-34.0	0.0	0.0	45.2	74.0	-28.8	H	P	
4.924	3.0	30.8	33.2	6.8	-34.0	0.0	0.0	36.8	54.0	-17.2	H	A	
4.924	3.0	46.3	33.2	6.8	-34.0	0.0	0.0	52.3	74.0	-21.7	V	P	
4.924	3.0	42.6	33.2	6.8	-34.0	0.0	0.0	48.6	54.0	-5.4	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

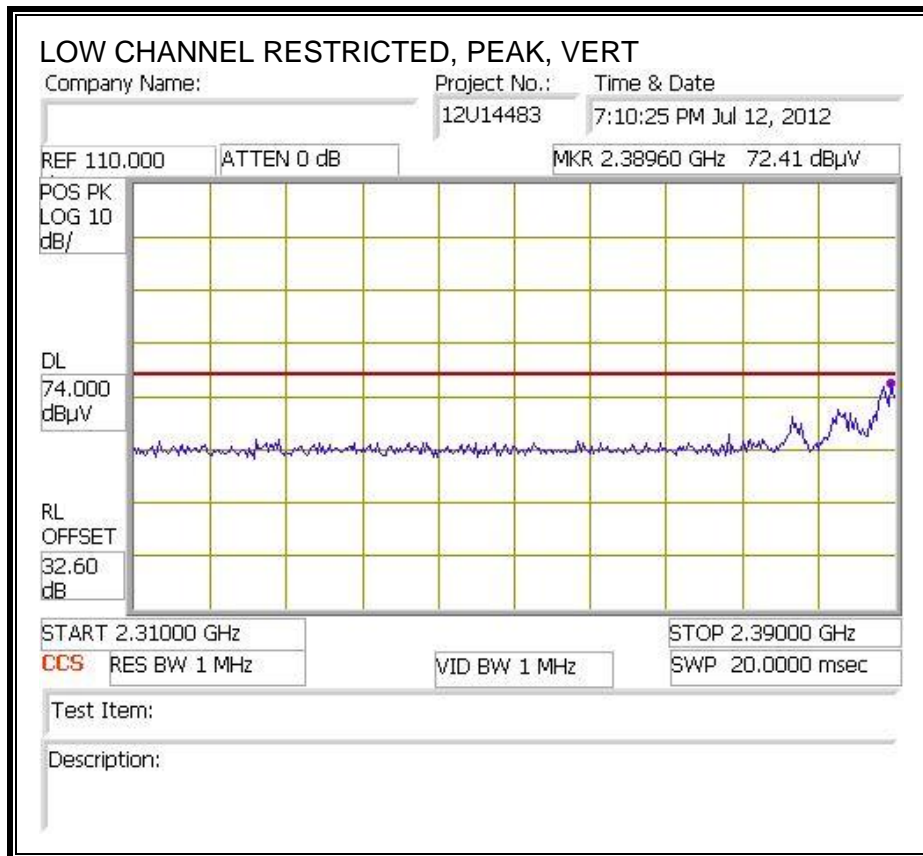
### 7.2.2. TX ABOVE 1 GHz, 802.11n HT20 CDD 3TX MODE IN THE 2.4 GHz BAND

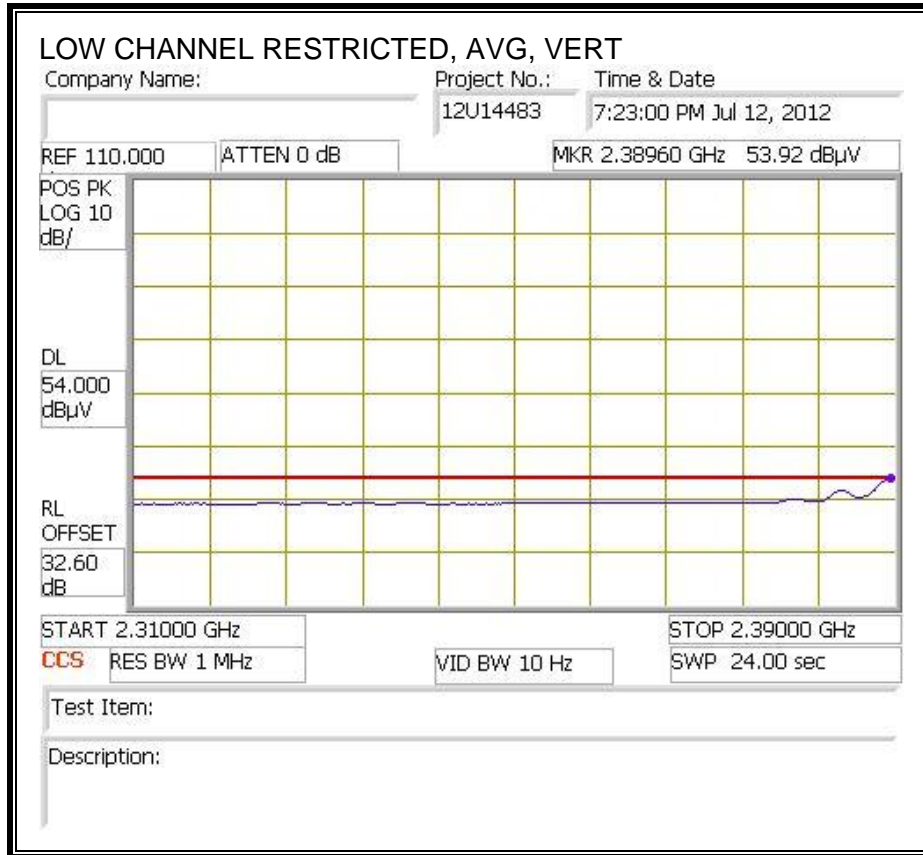
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





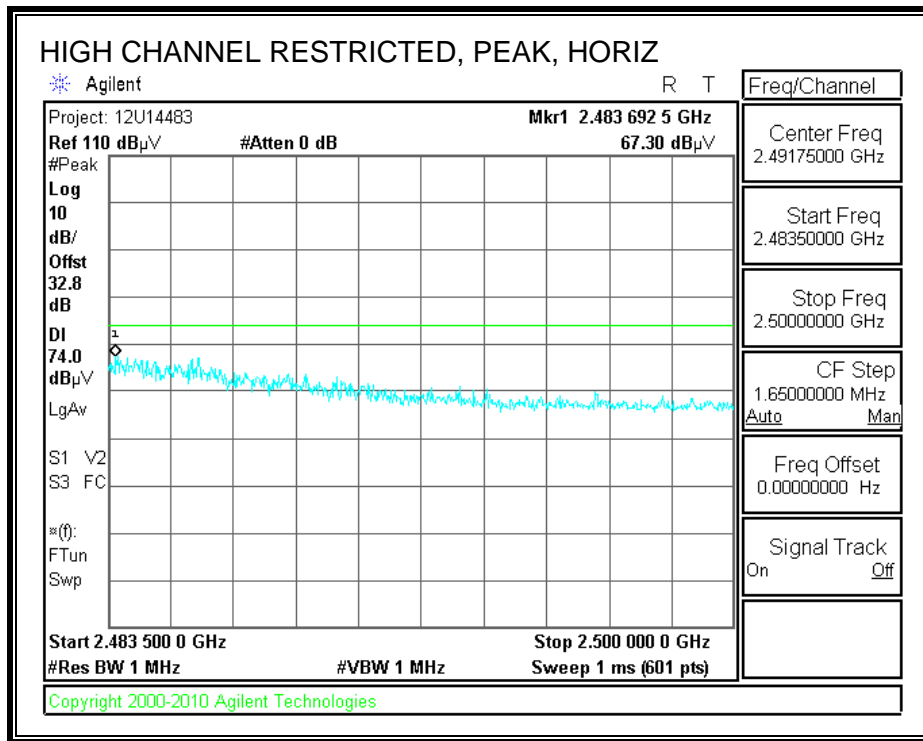
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

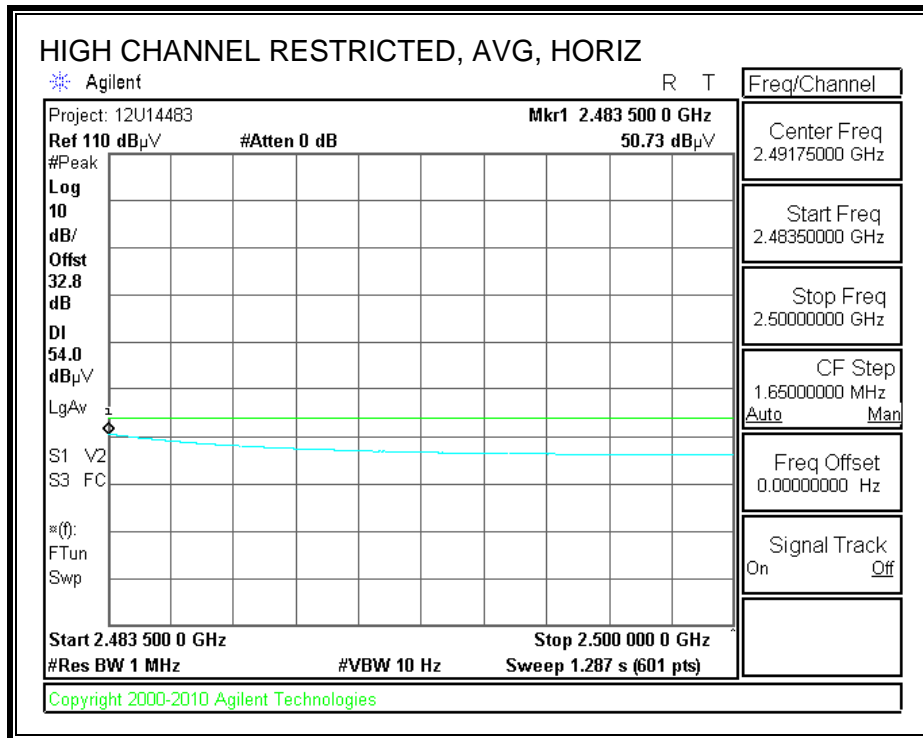




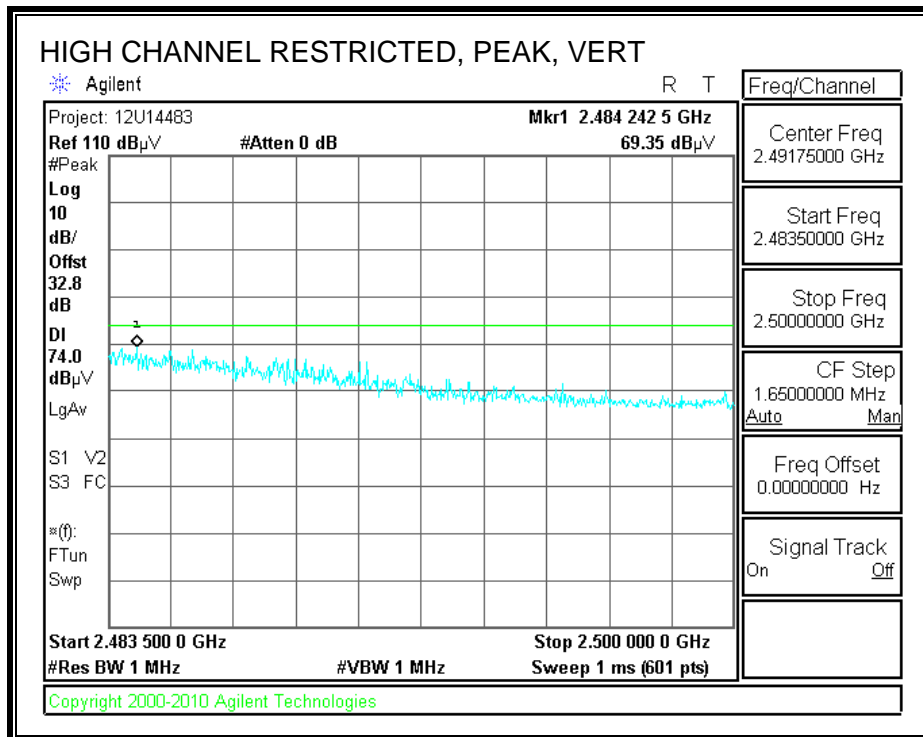


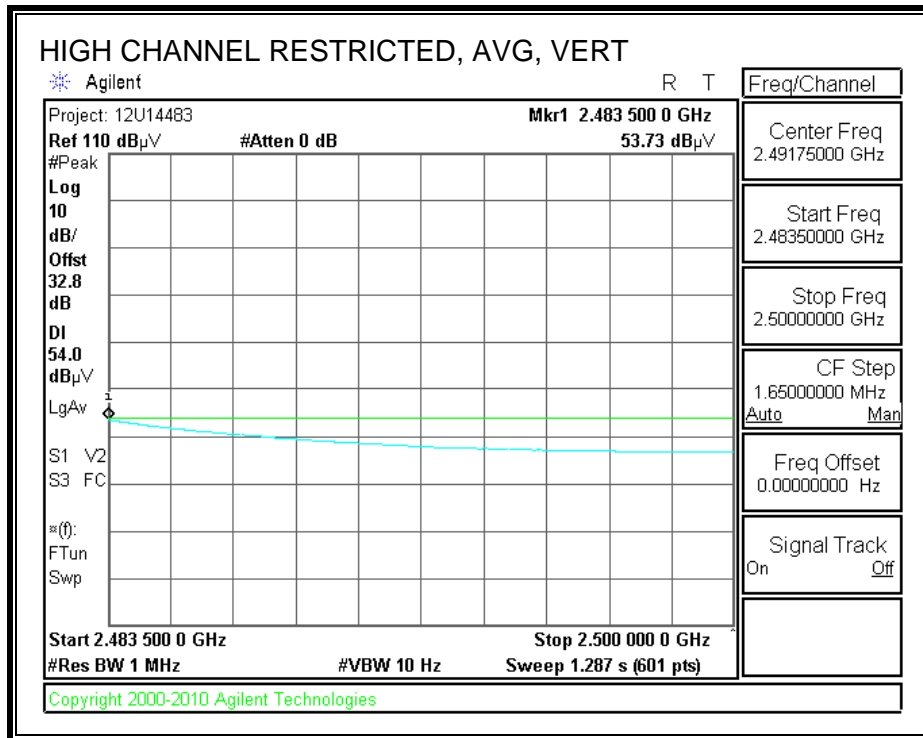
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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





**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		TomChen											
Date:		07/12/12											
Project #:		12U14483											
Company:		Apple Inc.											
Test Target:		FCC Class B											
Mode Oper:		802.11n HT20 3TX CDD											
f	Measurement Frequency	Amp	Preamp Gain					Average Field Strength Limit					
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters					Peak Field Strength Limit					
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m					Margin vs. Average Limit					
AF	Antenna Factor	Peak	Calculated Peak Field Strength					Margin vs. Peak Limit					
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>2412MHz HT20</b>													
4.824	3.0	37.2	33.1	6.8	-34.1	0.0	0.0	43.1	74.0	-30.9	H	P	
4.824	3.0	24.7	33.1	6.8	-34.1	0.0	0.0	30.5	54.0	-23.5	H	A	
4.824	3.0	42.0	33.1	6.8	-34.1	0.0	0.0	47.9	74.0	-26.1	V	P	
4.824	3.0	26.8	33.1	6.8	-34.1	0.0	0.0	32.7	54.0	-21.3	V	A	
<b>2437MHz HT20</b>													
4.874	3.0	42.5	33.2	6.8	-34.0	0.0	0.0	48.4	74.0	-25.6	V	P	
4.874	3.0	26.9	33.2	6.8	-34.0	0.0	0.0	32.8	54.0	-21.2	V	A	
4.874	3.0	38.4	33.2	6.8	-34.0	0.0	0.0	44.3	74.0	-29.7	H	P	
4.874	3.0	25.1	33.2	6.8	-34.0	0.0	0.0	31.0	54.0	-23.0	H	A	
<b>2462MHz b mode</b>													
4.924	3.0	41.1	33.2	6.8	-34.0	0.0	0.0	47.1	74.0	-26.9	V	P	
4.924	3.0	26.2	33.2	6.8	-34.0	0.0	0.0	32.2	54.0	-21.8	V	A	
4.924	3.0	36.9	33.2	6.8	-34.0	0.0	0.0	42.9	74.0	-31.1	H	P	
4.924	3.0	24.1	33.2	6.8	-34.0	0.0	0.0	30.1	54.0	-23.9	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

### 7.2.3. TX ABOVE 1 GHz, 802.11n HT20 3TX MODE IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		TomChen											
Date:		07/13/12											
Project #:		12U14483											
Company:		Apple Inc.											
Test Target:		FCC Class B											
Mode Oper:		802.11n HT20 3TX CDD											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>5745 MHz HT20</b>													
11.490	3.0	39.3	38.9	11.2	-33.1	0.0	0.7	57.0	74.0	-17.0	V	P	
11.490	3.0	29.5	38.9	11.2	-33.1	0.0	0.7	47.2	54.0	-6.8	V	A	
11.490	3.0	35.0	38.9	11.2	-33.1	0.0	0.7	52.7	74.0	-21.3	H	P	
11.490	3.0	24.5	38.9	11.2	-33.1	0.0	0.7	42.2	54.0	-11.8	H	A	
<b>5785 MHz HT20</b>													
11.570	3.0	34.7	38.9	11.3	-33.0	0.0	0.7	52.7	74.0	-21.3	H	P	
11.570	3.0	24.9	38.9	11.3	-33.0	0.0	0.7	42.8	54.0	-11.2	H	A	
11.570	3.0	40.0	38.9	11.3	-33.0	0.0	0.7	57.9	74.0	-16.1	V	P	
11.570	3.0	31.2	38.9	11.3	-33.0	0.0	0.7	49.2	54.0	-4.8	V	A	
<b>5825 MHz HT20</b>													
11.650	3.0	41.7	39.0	11.4	-32.9	0.0	0.7	60.0	74.0	-14.0	V	P	
11.650	3.0	30.8	39.0	11.4	-32.9	0.0	0.7	49.0	54.0	-5.0	V	A	
11.650	3.0	36.0	39.0	11.4	-32.9	0.0	0.7	54.2	74.0	-19.8	H	P	
11.650	3.0	26.0	39.0	11.4	-32.9	0.0	0.7	44.2	54.0	-9.8	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

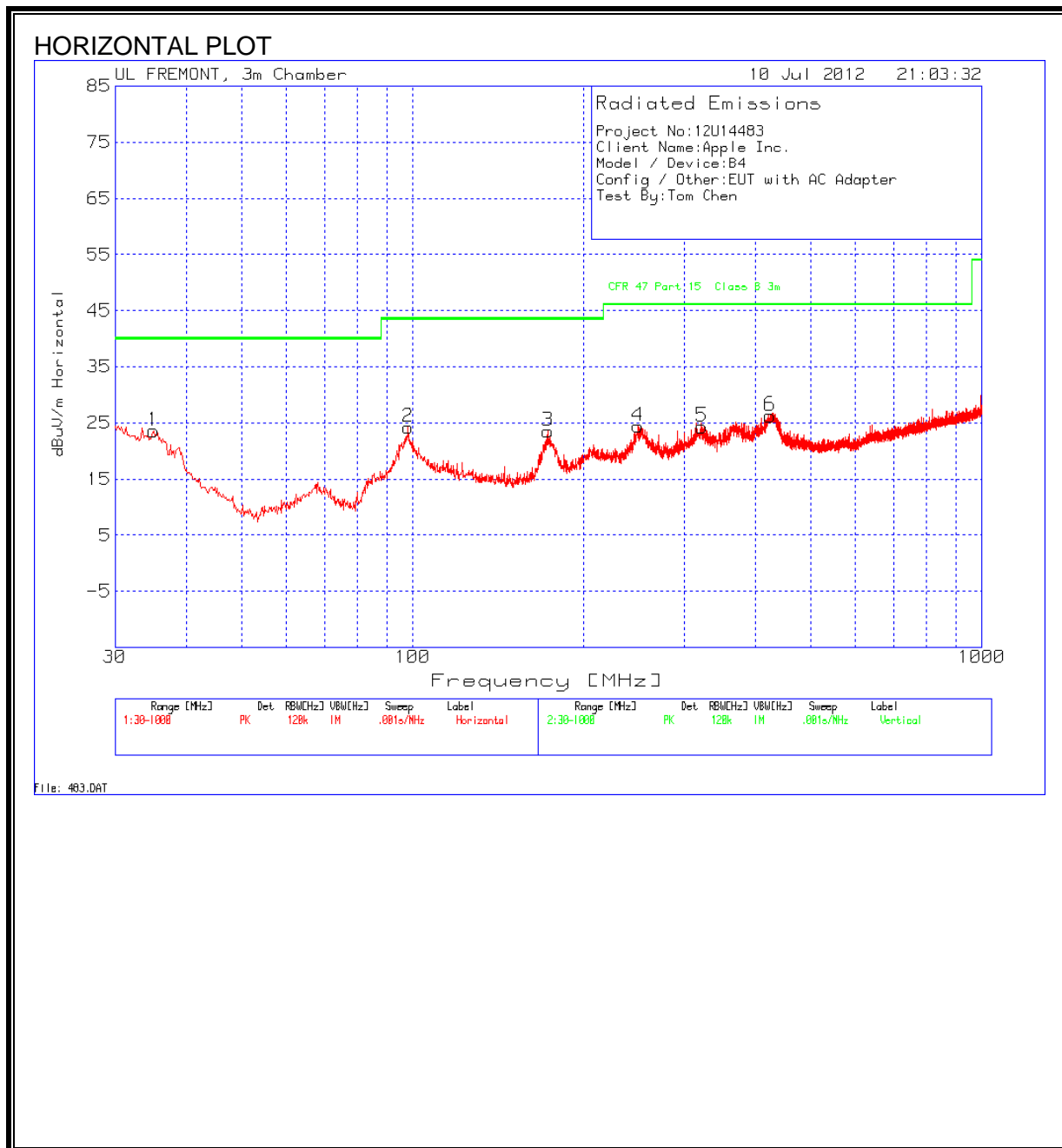
**7.2.4. TX ABOVE 1 GHz, 802.11n HT40 3TX MODE IN THE 5.8 GHz BAND**

**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		TomChen											
Date:		07/13/12											
Project #:		12U14483											
Company:		Apple Inc.											
Test Target:		FCC Class B											
Mode Oper:		802.11n HT40 3TX CDD											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/Q/P	
<b>5755 MHz HT40</b>													
11.510	3.0	36.1	38.9	11.2	-33.0	0.0	0.7	53.8	74.0	-20.2	H	P	
11.510	3.0	26.4	38.9	11.2	-33.0	0.0	0.7	44.1	54.0	-9.9	H	A	
11.510	3.0	39.7	38.9	11.2	-33.0	0.0	0.7	57.4	74.0	-16.6	V	P	
11.510	3.0	30.1	38.9	11.2	-33.0	0.0	0.7	47.8	54.0	-6.2	V	A	
<b>5795 MHz HT40</b>													
11.590	3.0	40.2	39.0	11.3	-33.0	0.0	0.7	58.3	74.0	-15.7	V	P	
11.590	3.0	30.2	39.0	11.3	-33.0	0.0	0.7	48.3	54.0	-5.8	V	A	
11.590	3.0	35.1	39.0	11.3	-33.0	0.0	0.7	53.1	74.0	-20.9	H	P	
11.590	3.0	25.1	39.0	11.3	-33.0	0.0	0.7	43.1	54.0	-10.9	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

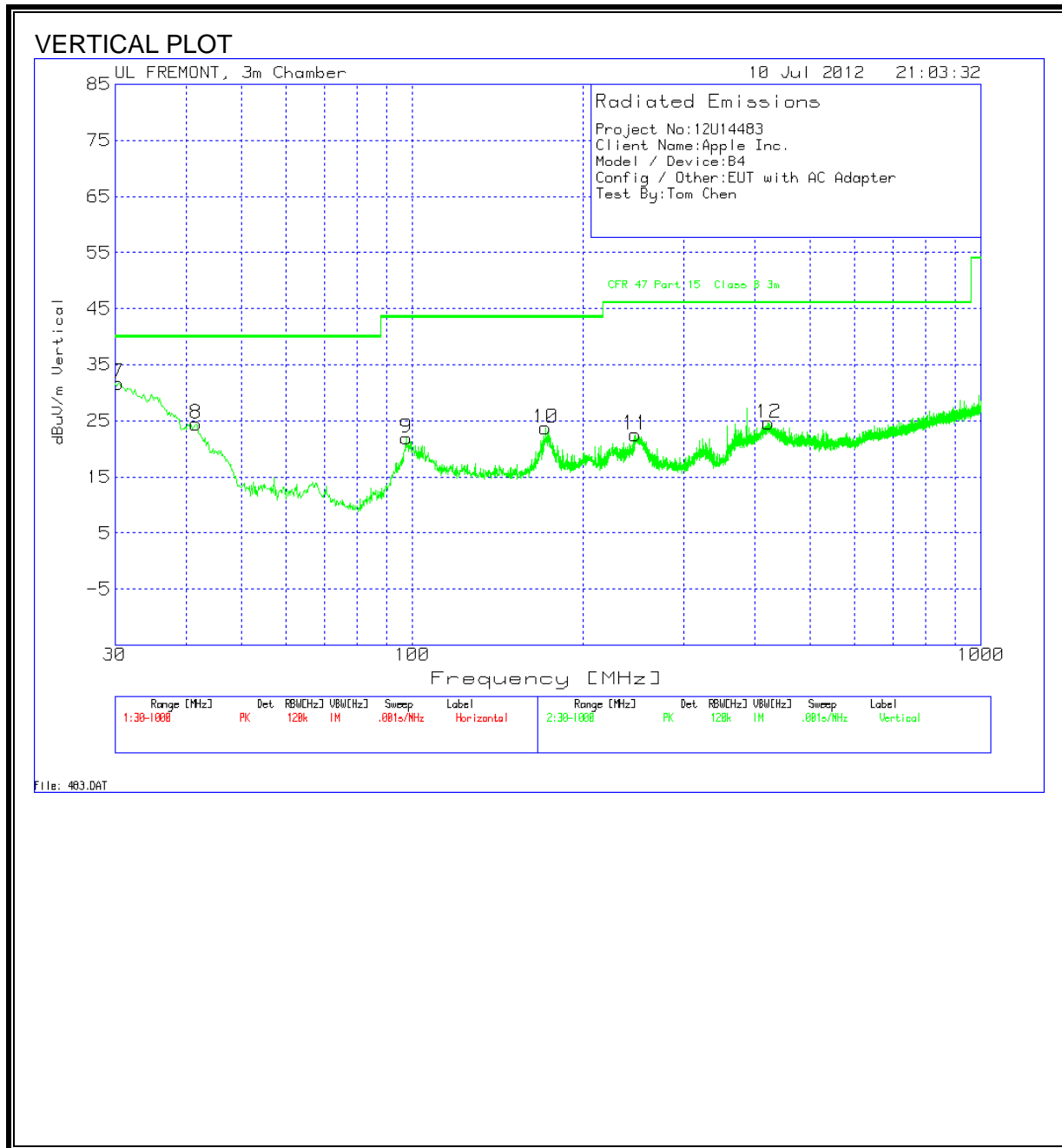
### 7.3. WORST-CASE BELOW 1 GHz

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





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



**EMI DATA**

Project No:12U14483								
Client Name:Apple Inc.								
Model / Device:B4								
Config / Other:EUT with AC Adapter								
Test By:Tom Chen								
Horizontal 30 - 1000MHz								
Test Frequency	Meter Reading	Detector	25MHz-1GHz Chambr 3m Amplified (dB)	Antenna T185 (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
35.04	33.69	PK	-27.5	17.4	23.59	40	-16.41	Horz
98.2334	41.8	PK	-26.9	9.3	24.2	43.5	-19.3	Horz
172.8637	38.41	PK	-26.1	11.2	23.51	43.5	-19.99	Horz
249.2386	38.34	PK	-25.4	11.5	24.44	46	-21.56	Horz
322.1243	35.84	PK	-25.3	13.8	24.34	46	-21.66	Horz
424.6683	35.55	PK	-25.7	16.4	26.25	46	-19.75	Horz
Vertical 30 - 1000MHz								
Test Frequency	Meter Reading	Detector	25MHz-1GHz Chambr 3m Amplified (dB)	Antenna T185 (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
30.3877	38.33	PK	-27.5	20.9	31.73	40	-8.27	Vert
41.6307	39.29	PK	-27.4	12.6	24.49	40	-15.51	Vert
97.6519	39.65	PK	-26.9	9.2	21.95	43.5	-21.55	Vert
171.5068	38.45	PK	-26.1	11.4	23.75	43.5	-19.75	Vert
246.7186	36.34	PK	-25.4	11.6	22.54	46	-23.46	Vert
423.3114	34.04	PK	-25.7	16.3	24.64	46	-21.36	Vert

## 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**

Project No:12U14483									
Client Name:Apple Inc.									
Model/Device:B4									
Test Volt/Freq:120 VAC / 60Hz									
Test By:Tom Chen									

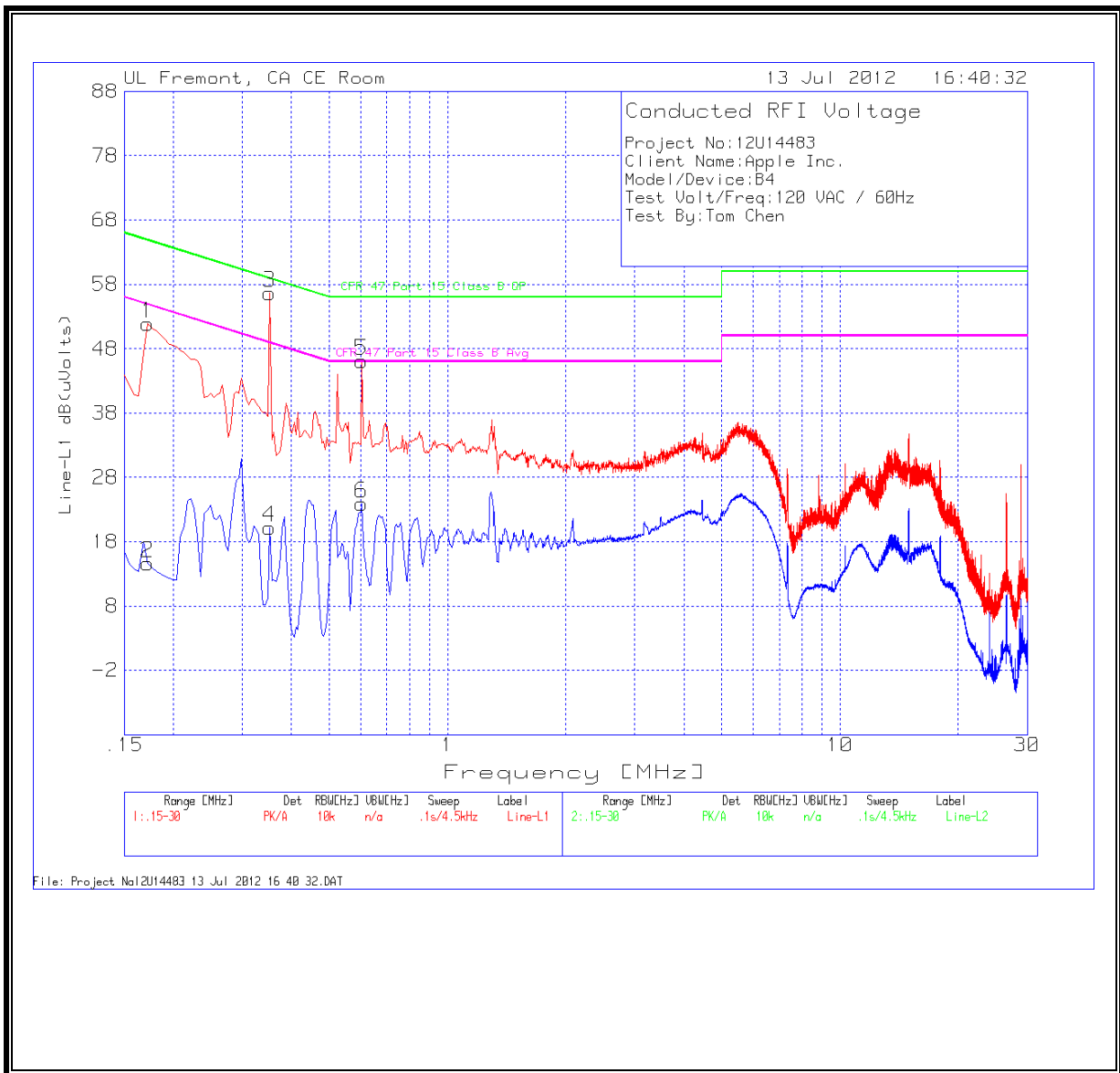
Line-L1 .15 - 30MHz

Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1725	51.83	PK	0.1	0	51.93	64.8	-12.87	-	-
0.1725	14.51	Av	0.1	0	14.61	-	-	54.8	-40.19
0.3525	56.54	PK	0.1	0	56.64	58.9	-2.26	-	-
0.3525	20.14	Av	0.1	0	20.24	-	-	48.9	-28.66
0.6045	46.01	PK	0.1	0	46.11	56	-9.89	-	-
0.6045	23.84	Av	0.1	0	23.94	-	-	46	-22.06

Line-L2 .15 - 30MHz

Test Frequency	Meter Reading	Detector	T24 IL L2.TXT (dB)	LC Cables 2&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.2085	46.3	PK	0.1	0	46.4	63.3	-16.9	-	-
0.2085	29.6	Av	0.1	0	29.7	-	-	53.3	-23.6
0.357	38.74	PK	0.1	0	38.84	58.8	-19.96	-	-
0.357	32.35	Av	0.1	0	32.45	-	-	48.8	-16.35
0.501	32.23	PK	0.1	0	32.33	56	-23.67	-	-
0.501	25.67	Av	0.1	0	25.77	-	-	46	-20.23

**LINE 1 RESULTS**



**LINE 2 RESULTS**

