



**FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

**GSM850~1900 + WCDMA 850~1900 + LTE SMART PHONE
with BLUETOOTH + BLE and WLAN 2.4GHz**

**MODEL NUMBER: LGMS659, LG-MS659, MS659, LG-P659,
LGP659, P659**

FCC ID: ZNFMS659

REPORT NUMBER: 13U14990-2

ISSUE DATE: MAY 15, 2013

Prepared for
**LG ELECTRONICS MOBILECOMM U.S.A., INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632**

Prepared by
**UL VERIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888**



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	05/15/13	Initial Issue	P. Kim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>5</i>
4.2. <i>SAMPLE CALCULATION</i>	<i>5</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>5</i>
5. EQUIPMENT UNDER TEST	6
5.1. <i>DESCRIPTION OF EUT</i>	<i>6</i>
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	<i>6</i>
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	<i>7</i>
5.4. <i>SOFTWARE AND FIRMWARE.....</i>	<i>7</i>
5.5. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>8</i>
5.6. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>9</i>
6. TEST AND MEASUREMENT EQUIPMENT	11
7. MEASUREMENT METHODS	12
8. RADIATED TEST RESULTS.....	13
8.1. <i>LIMITS AND PROCEDURE</i>	<i>13</i>
8.2. <i>TRANSMITTER ABOVE 1 GHz.....</i>	<i>14</i>
8.2.1. <i>TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND</i>	<i>14</i>
8.2.2. <i>TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND</i>	<i>27</i>
8.2.3. <i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND.....</i>	<i>40</i>
8.3. <i>WORST-CASE BELOW 1 GHz.....</i>	<i>53</i>
9. SETUP PHOTOS.....	57

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632

EUT DESCRIPTION: GSM850~1900 + WCDMA 850~1900 + LTE SMART PHONE with
BLUETOOTH + BLE and WLAN 2.4GHz

MODEL: LGMS659, LG-MS659, MS659, LG-P659, LGP659, P659

SERIAL NUMBER: 0GGG7

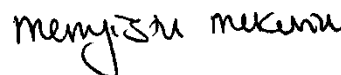
DATE TESTED: May 8 – May 17, 2013

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 Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By: Tested By:



PHILIP KIM
WiSE PROGRAM MANAGER
UL Verification Services Inc.

MENGISTU MEKURIA
WiSE EMC ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2009, 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 Verification Services Inc. 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 a Tri-Band Cellphone with Bluetooth, WLAN and LTE.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	19.43	87.70
2412 - 2462	802.11g	22.84	192.31
2412 - 2462	802.11n HT20	20.73	118.30

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PIFA antenna, with a maximum gain of -0.51 dBi.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was MS795_LAP8930JR130304.

5.5. 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.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, and Z. It was determined that Y-orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y-orientation with AC adapter and headset.

Worst-case data rates as provided by the client were:
Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WR	EAY62768916	NA
Headset	LG	NA	EAB62209301	NA

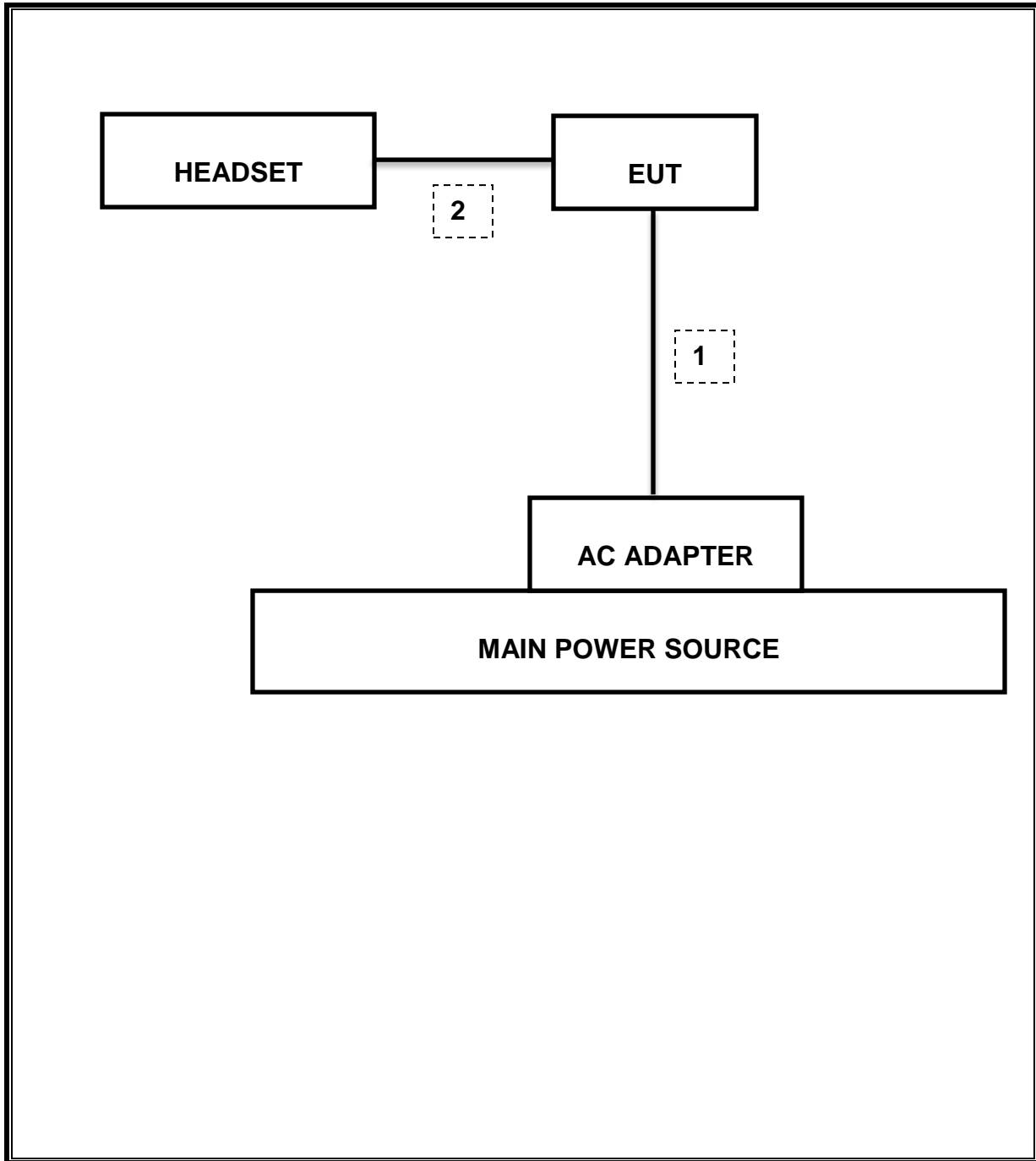
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Un-shielded	1m	NA
2	Jack	1	Earphone	Un-shielded	1.2m	NA

TEST SETUP

The EUT is a stand-alone unit 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 Date	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/12	08/14/13
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/12	12/11/13
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/12	11/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/13	01/16/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/12	10/22/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/12	10/21/13
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/12	08/08/13

7. MEASUREMENT METHODS

KDB 558074 Measurement Procedure PK2 is used for power and PKPSD is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

8. RADIATED TEST RESULTS

8.1. 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.

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.

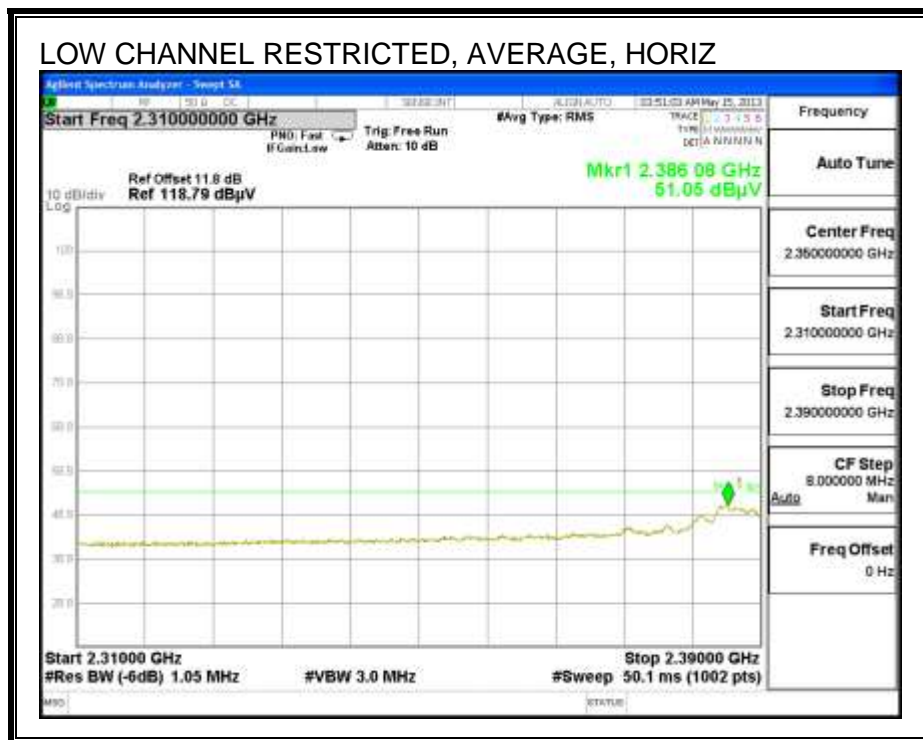
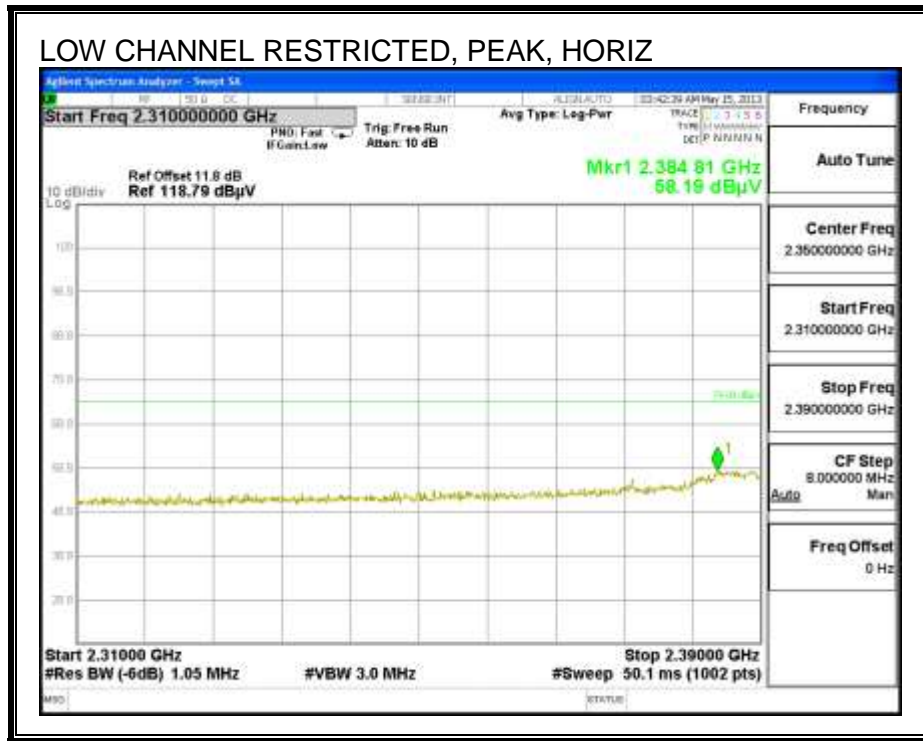
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

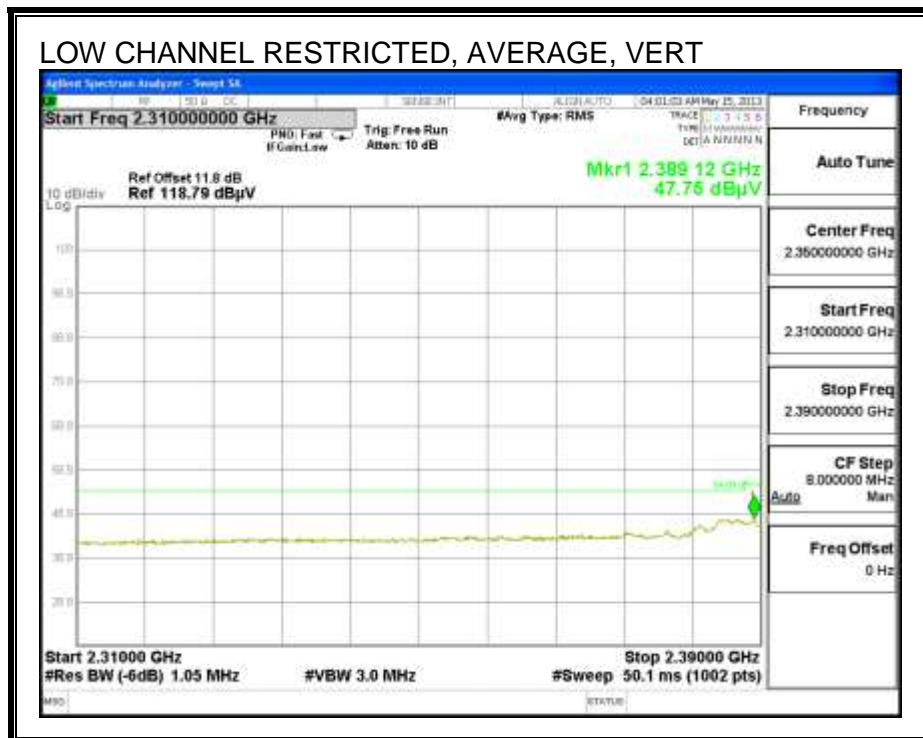
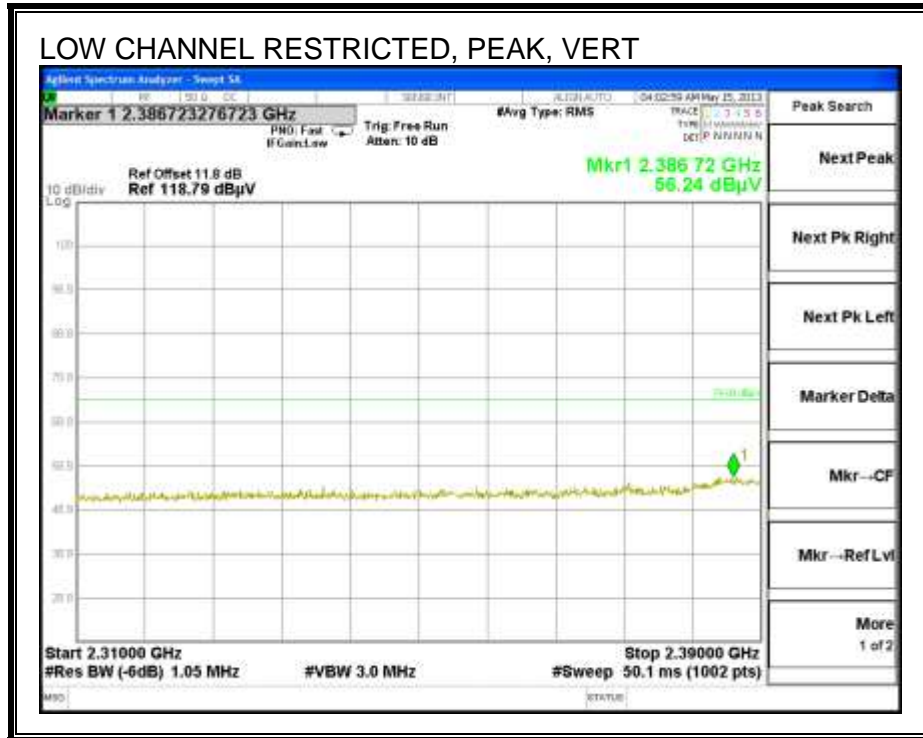
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

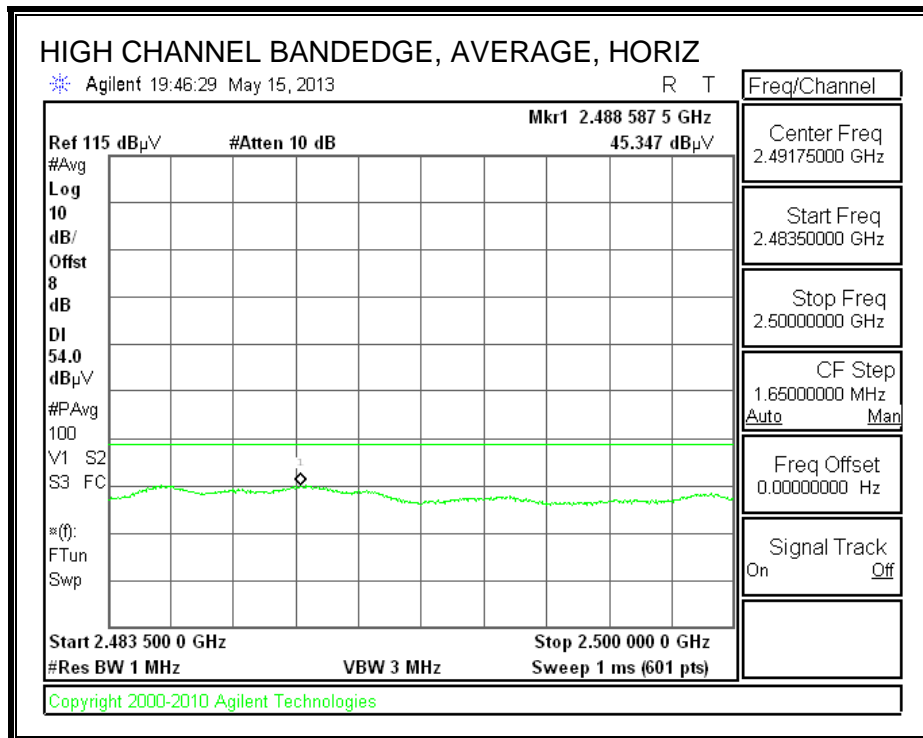
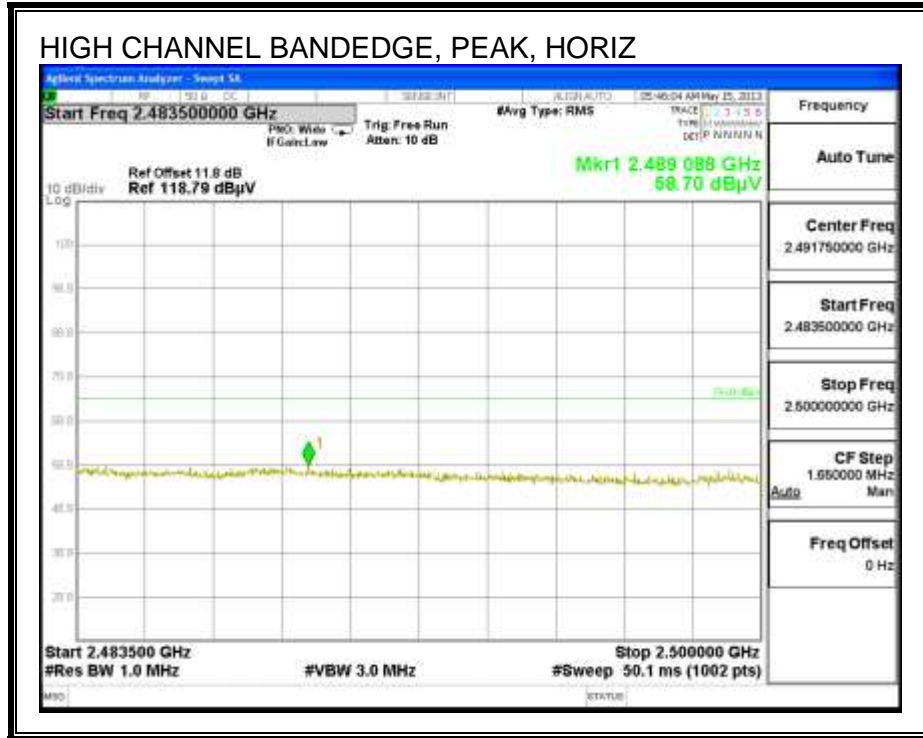
8.2. TRANSMITTER ABOVE 1 GHz

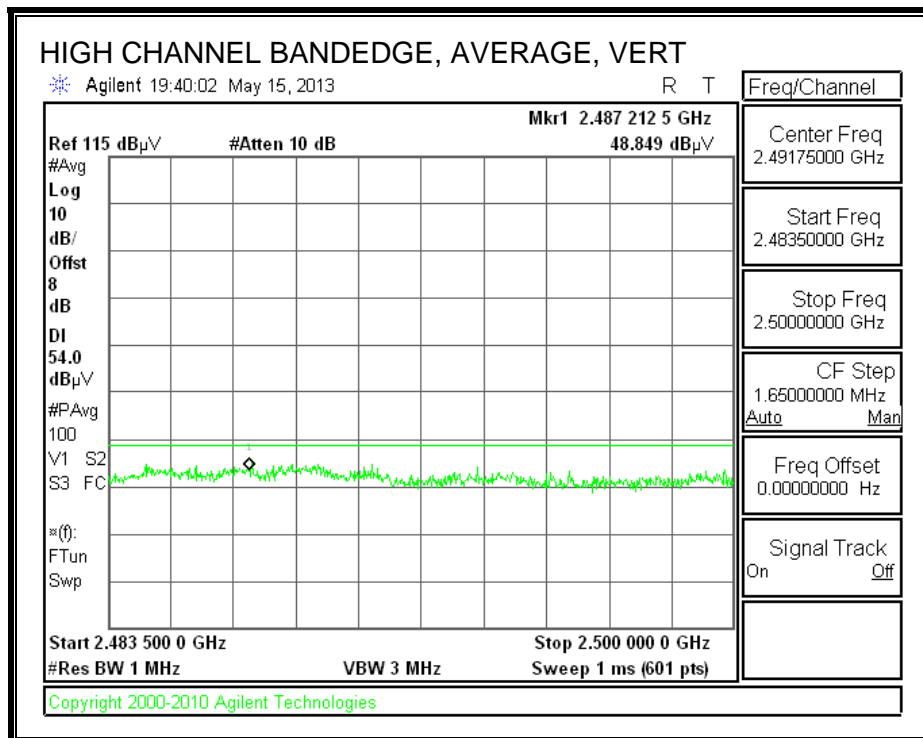
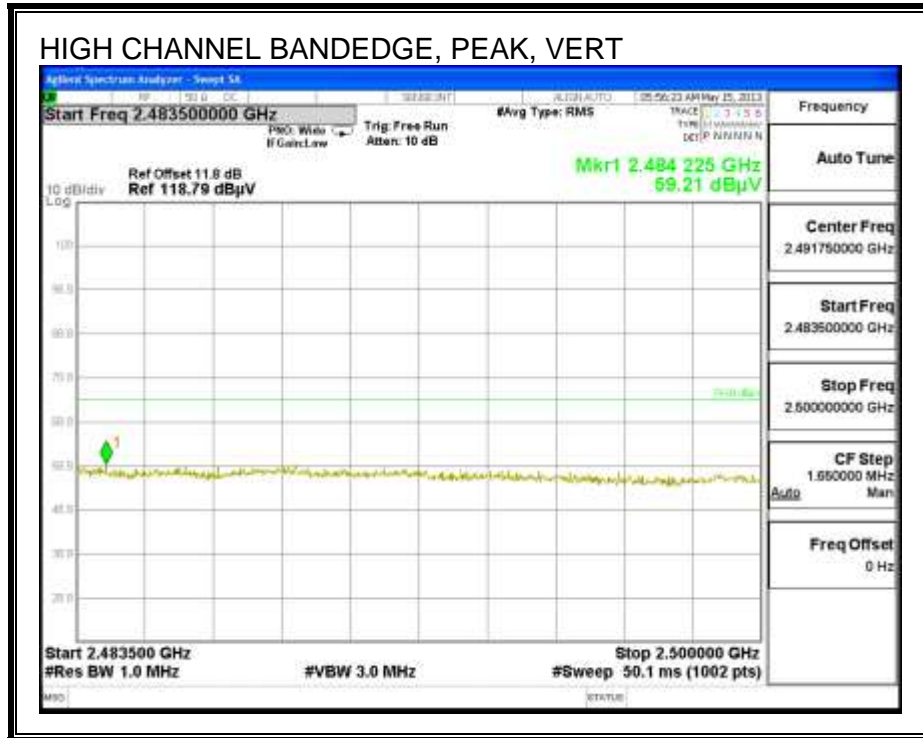
8.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





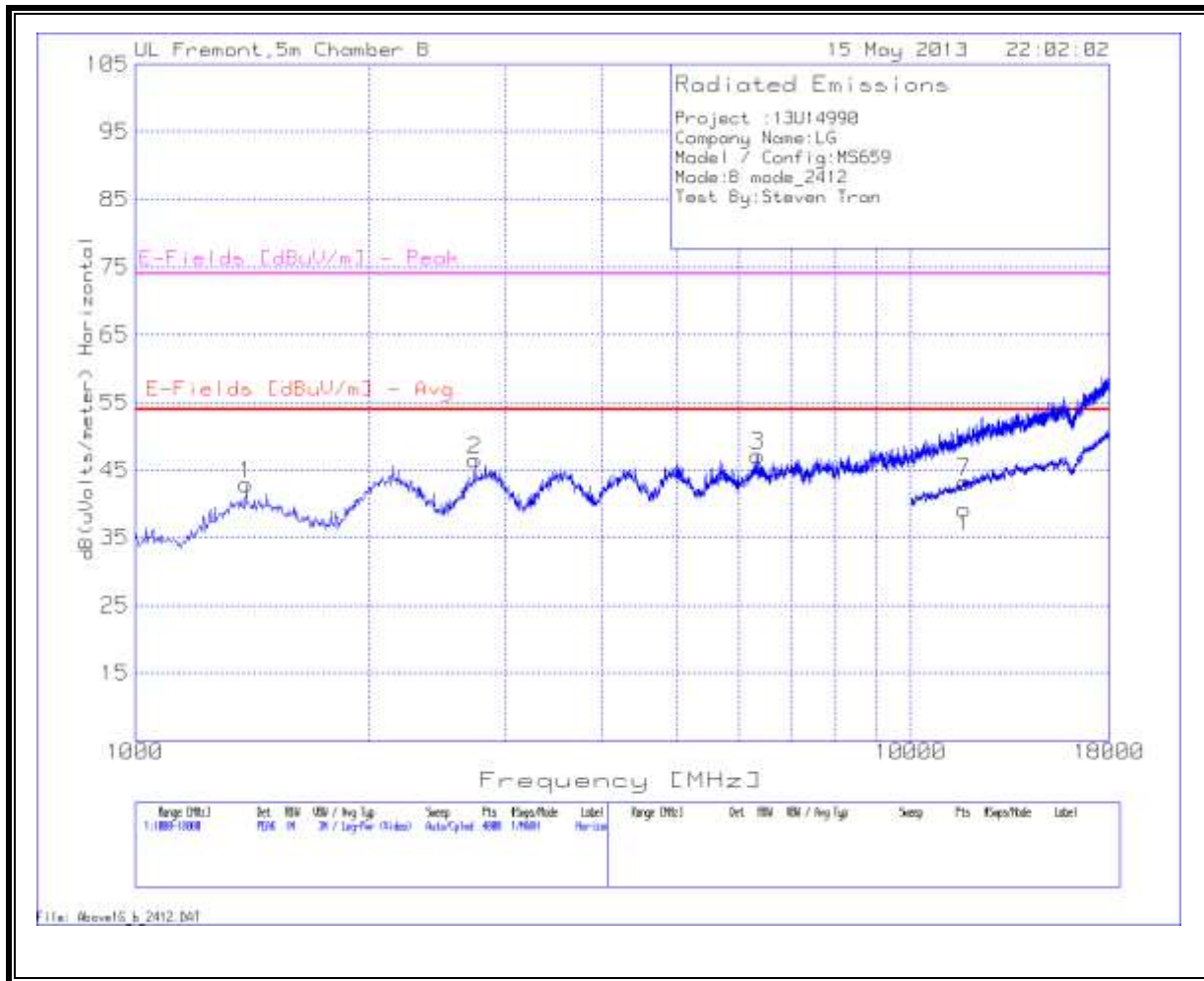
AUTHORIZED BANDEDGE (HIGH CHANNEL)



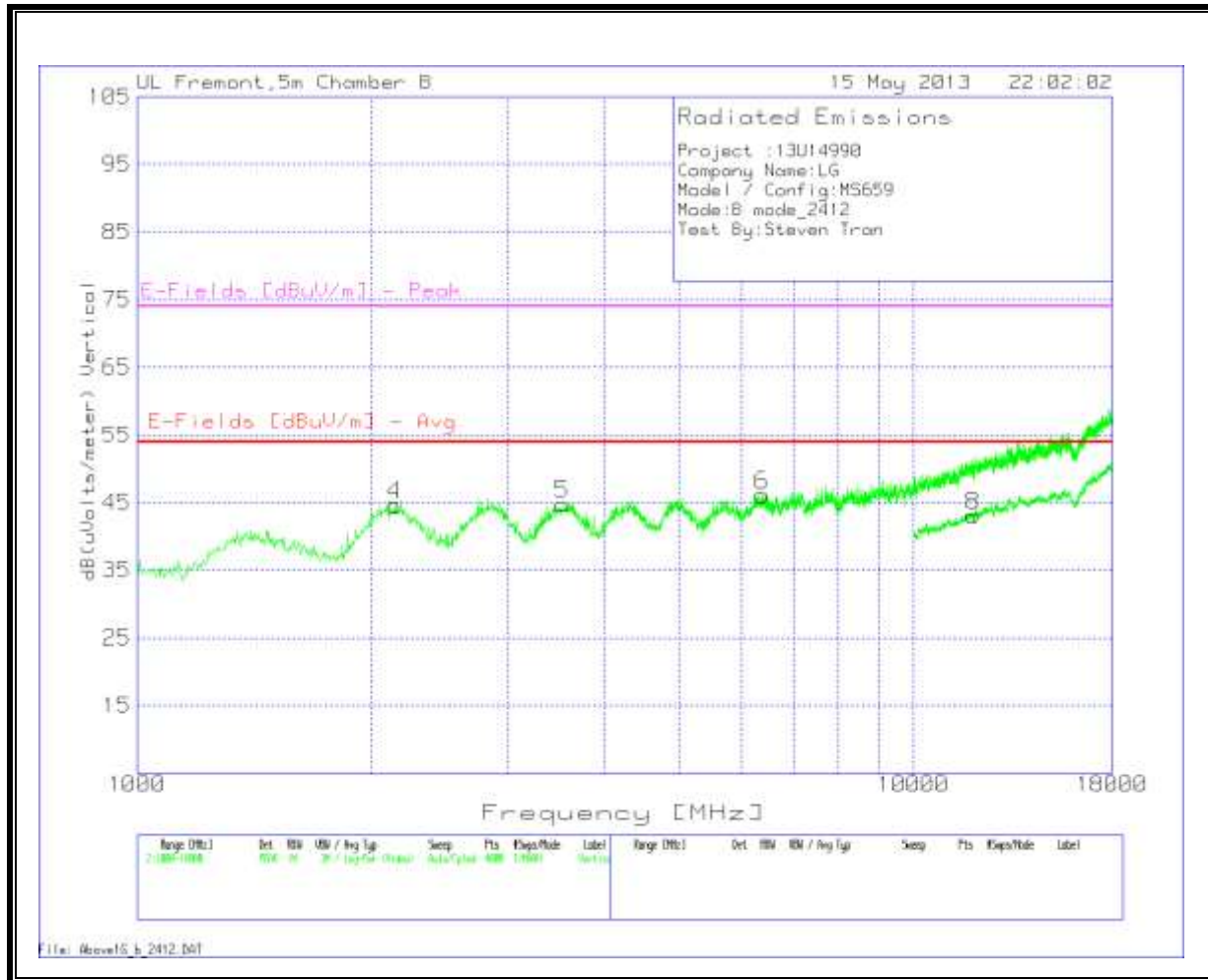


HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
 HORIZONTAL



VERTICAL

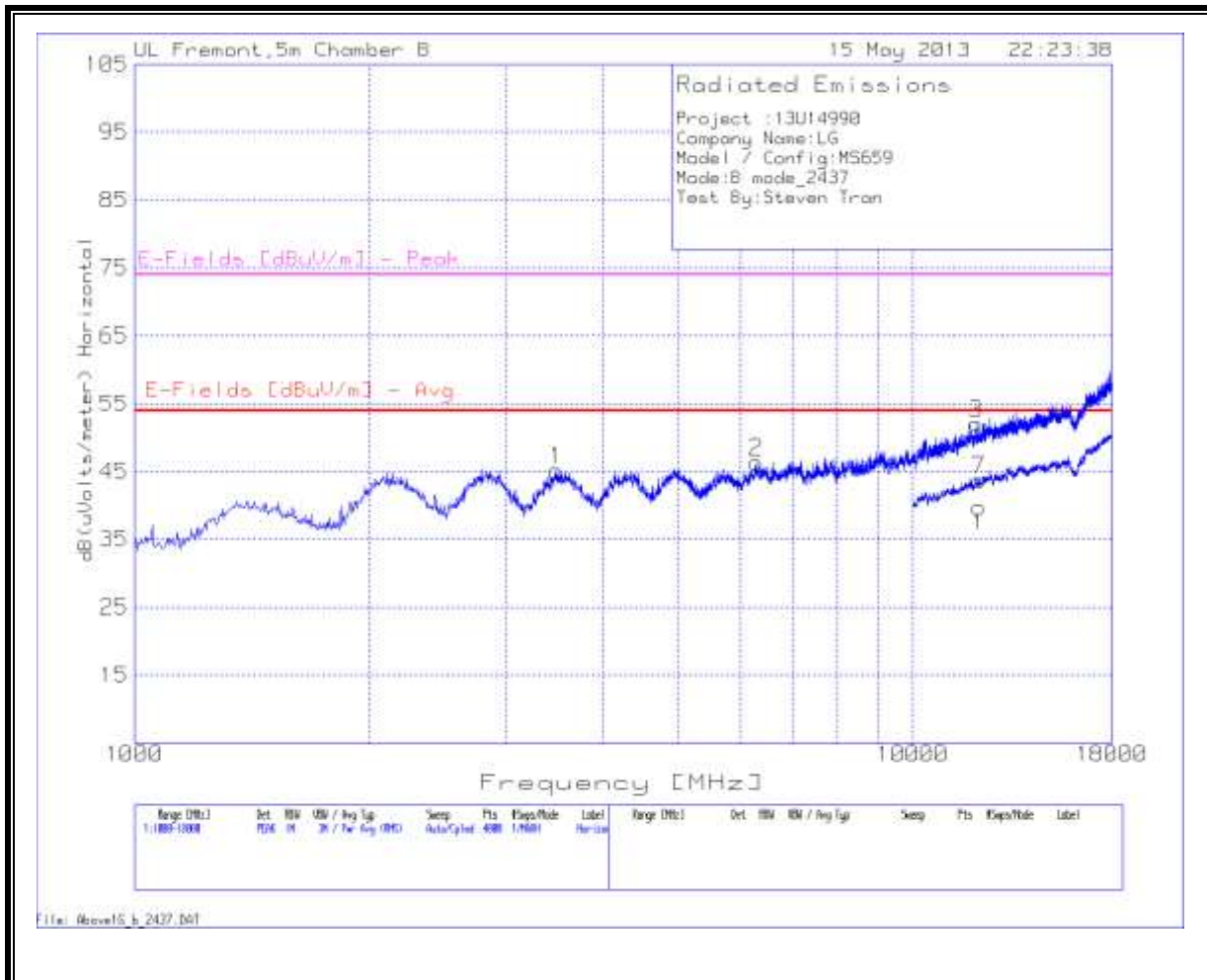


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

LOW CHANNEL DATA

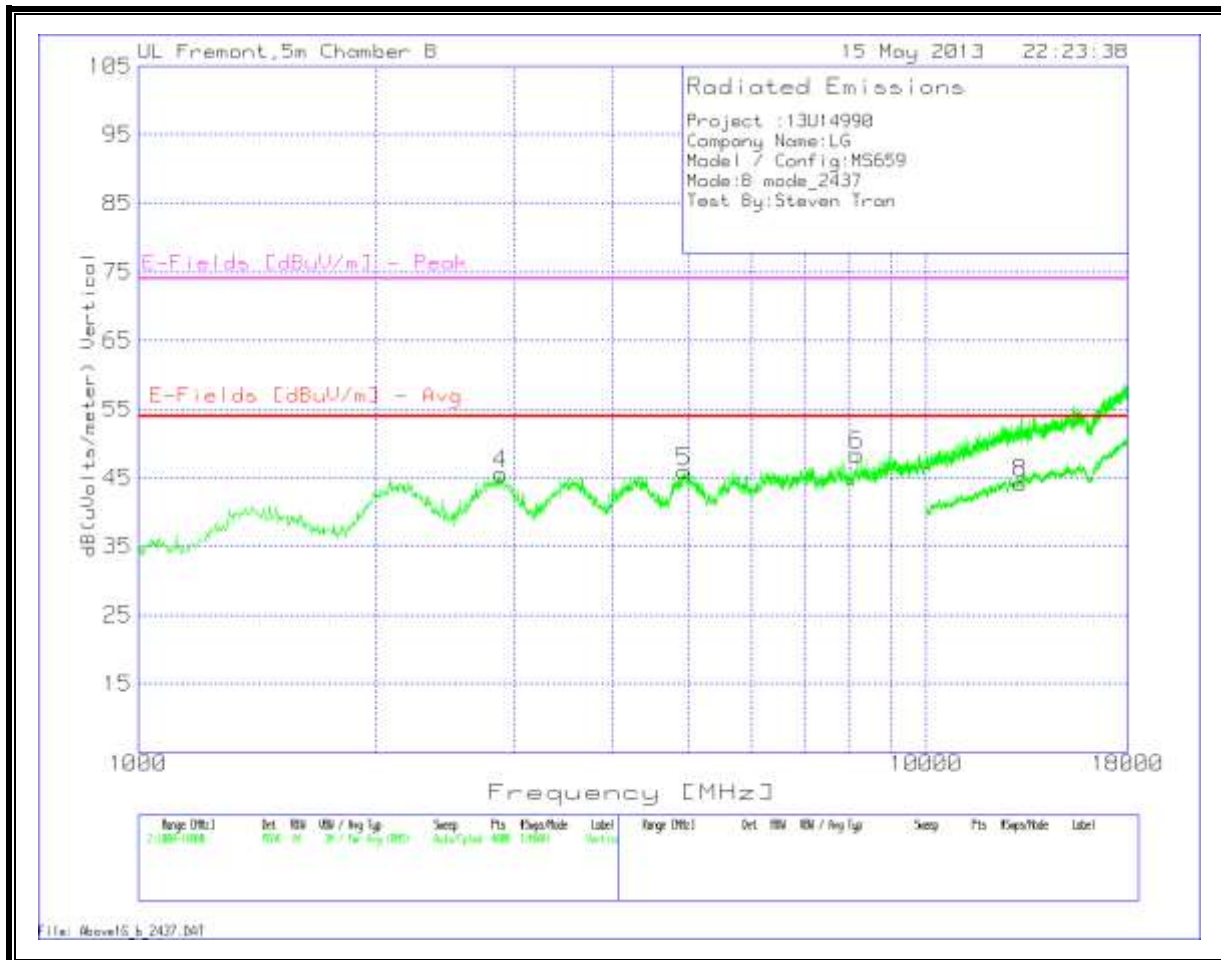
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:B mode_2412														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRFF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	1390.707	45.87	PK	28.4	-35.4	3.6	0.4	42.87	53.97	-11.1	74	-31.13	100	Horz
2	2741.194	42.84	PK	32.8	-35.1	5	0.9	46.44	53.97	-7.53	74	-27.56	100	Horz
3	6342.493	37.82	PK	36	-35	8.2	0.2	47.22	53.97	-6.75	74	-26.78	100	Horz
Vertical 1000 - 18000MHz														
4	2146.64	42.33	PK	32	-35	4.4	0.9	44.63	53.97	-9.34	74	-29.37	100	Vert
5	3526.855	40.21	PK	33.3	-35	5.8	0.5	44.81	53.97	-9.16	74	-29.19	200	Vert
6	6376.468	36.81	PK	35.9	-35	8.2	0.2	46.11	53.97	-7.86	74	-27.89	200	Vert
Horizontal 10000 - 18000MHz														
7	11715.142	25.7	PK	39	-33.5	11.4	0.6	43.2	53.97	-10.77	74	-30.8	100	Horz
Vertical 10000 - 18000MHz														
8	11947.026	25.5	PK	39.2	-33.4	11.5	0.3	43.1	53.97	-10.87	74	-30.9	100	Vert
PK - Peak detector														
Av - Average detector														

MID CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

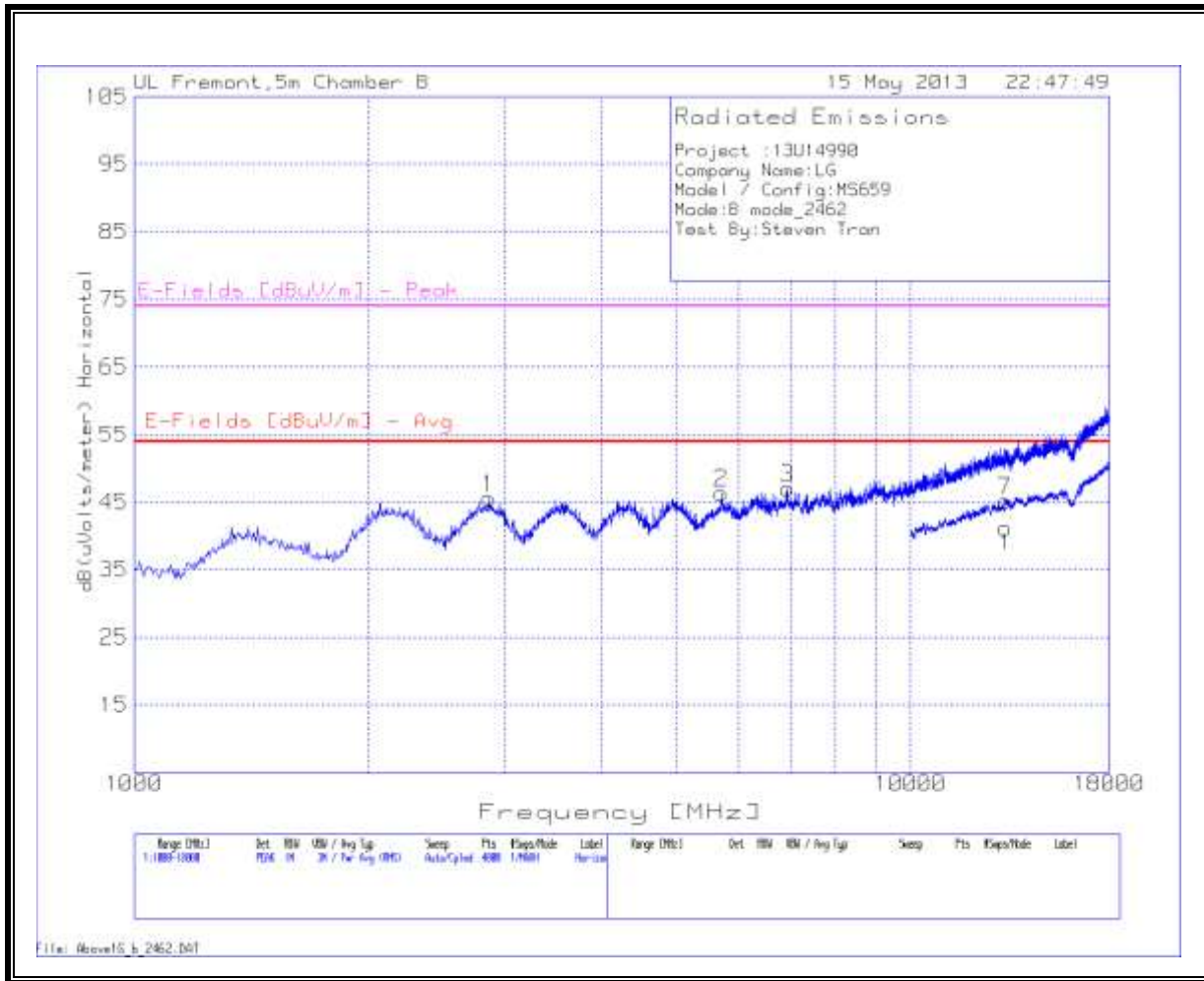


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

MID CHANNEL DATA

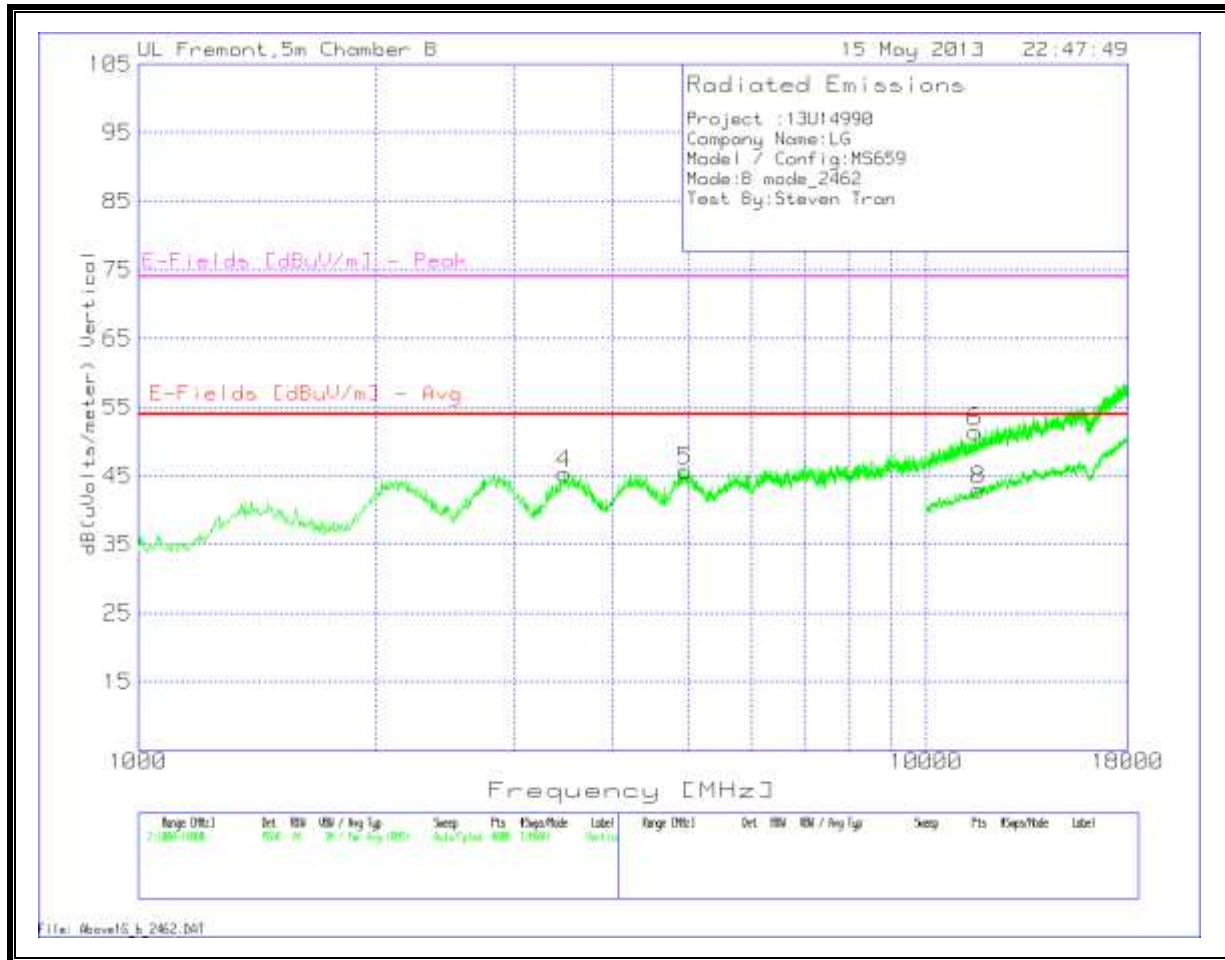
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:B mode_2437														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	3488.634	40.93	PK	33.2	-35	5.7	0.4	45.23	53.97	-8.74	74	-28.77	200	Horz
2	6300.025	36.99	PK	36	-35	8.2	0.2	46.39	53.97	-7.58	74	-27.61	100	Horz
3	12054.459	33.78	PK	39.2	-33.3	11.6	0.8	52.08	53.97	-1.89	74	-21.92	200	Horz
Vertical 1000 - 18000MHz														
4	2885.586	41.74	PK	33	-35.2	5.1	0.9	45.54	53.97	-8.43	74	-28.46	200	Vert
5	4936.797	38.81	PK	34.6	-34.9	7.2	0.2	45.91	53.97	-8.06	74	-28.09	200	Vert
6	8168.624	37.75	PK	36.1	-35.2	9.4	0.3	48.35	53.97	-5.62	74	-25.65	100	Vert
Horizontal 10000 - 18000MHz														
7	12154.923	25.37	PK	39.2	-33.1	11.6	0.6	43.67	53.97	-10.3	74	-30.33	200	Horz
Vertical 10000 - 18000MHz														
8	13174.413	24.29	PK	39.1	-31.8	12.2	0.5	44.29	53.97	-9.68	74	-29.71	100	Vert
PK - Peak detector														
Av - Average detector														

HIGH CHANNEL
HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

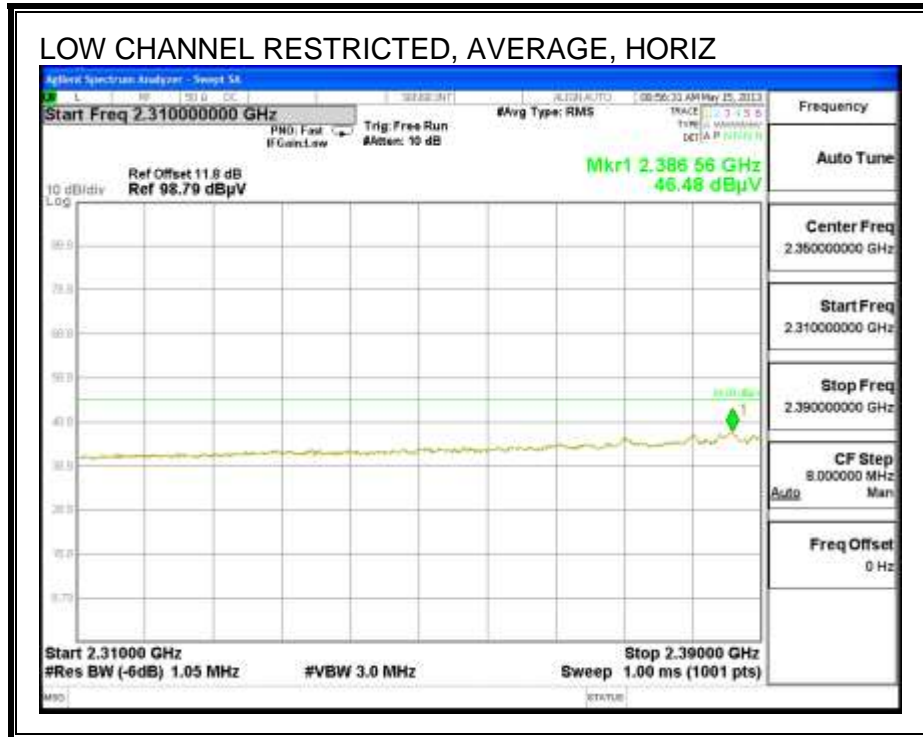
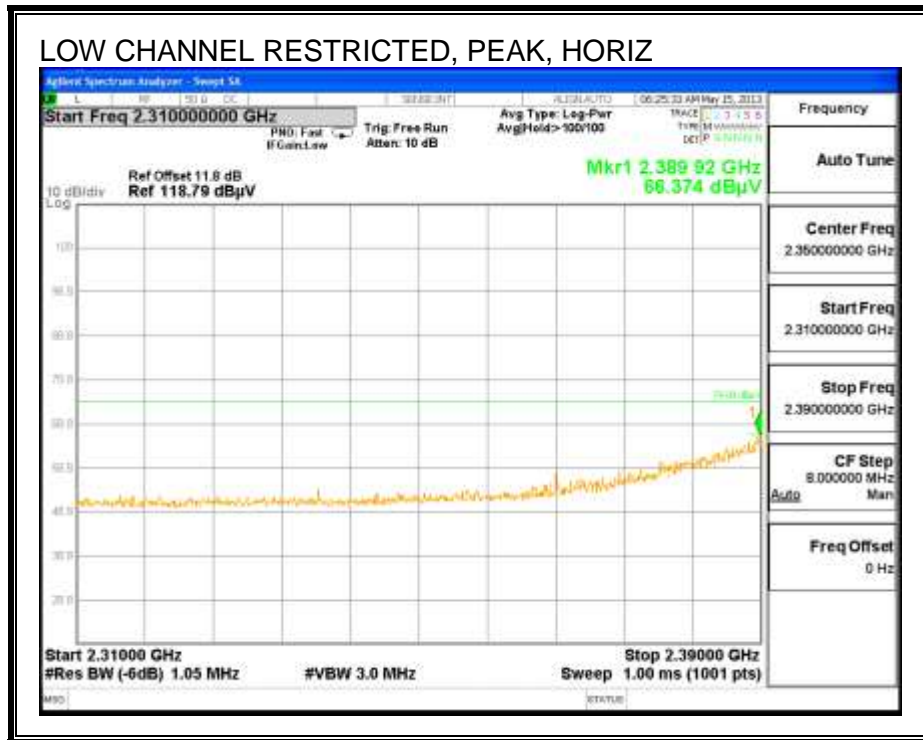


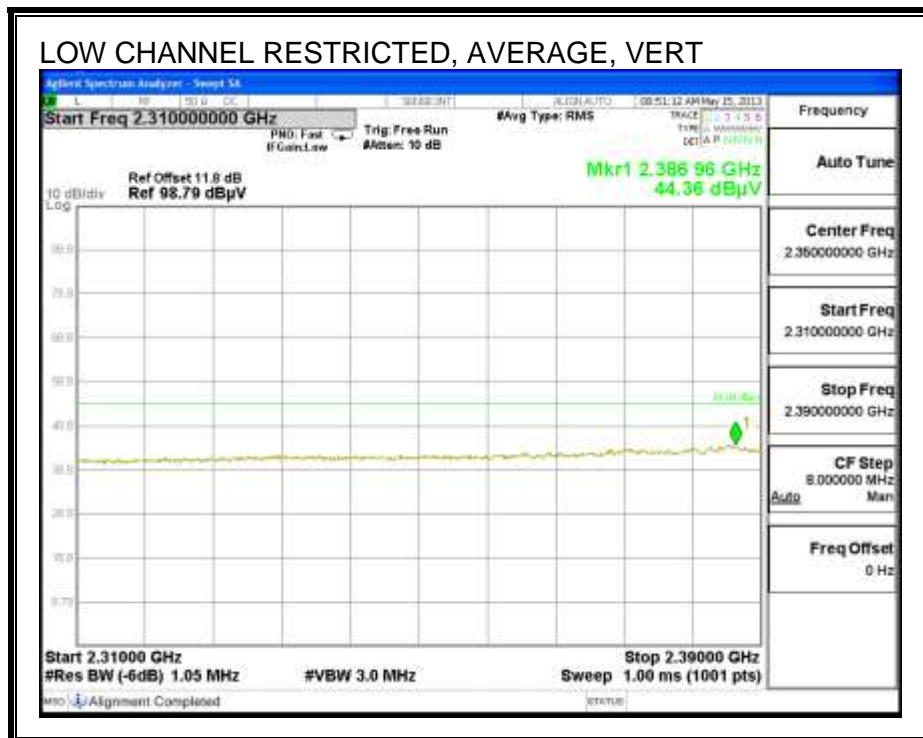
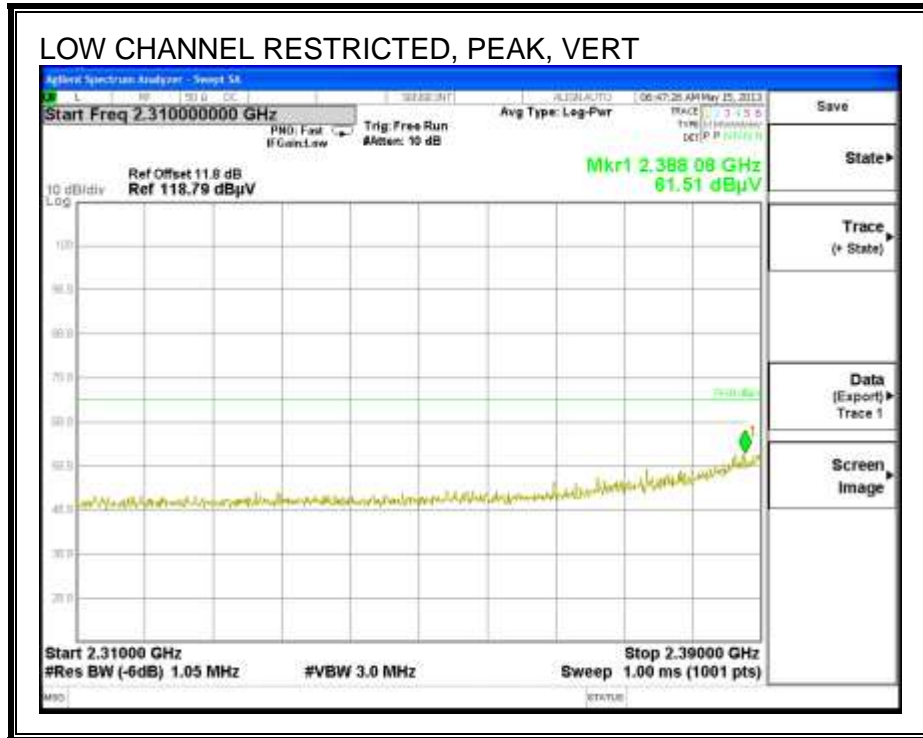
Note: Additional line displayed in the graph from 1-18GHz is average measurement.

HIGH CHANNEL DATA

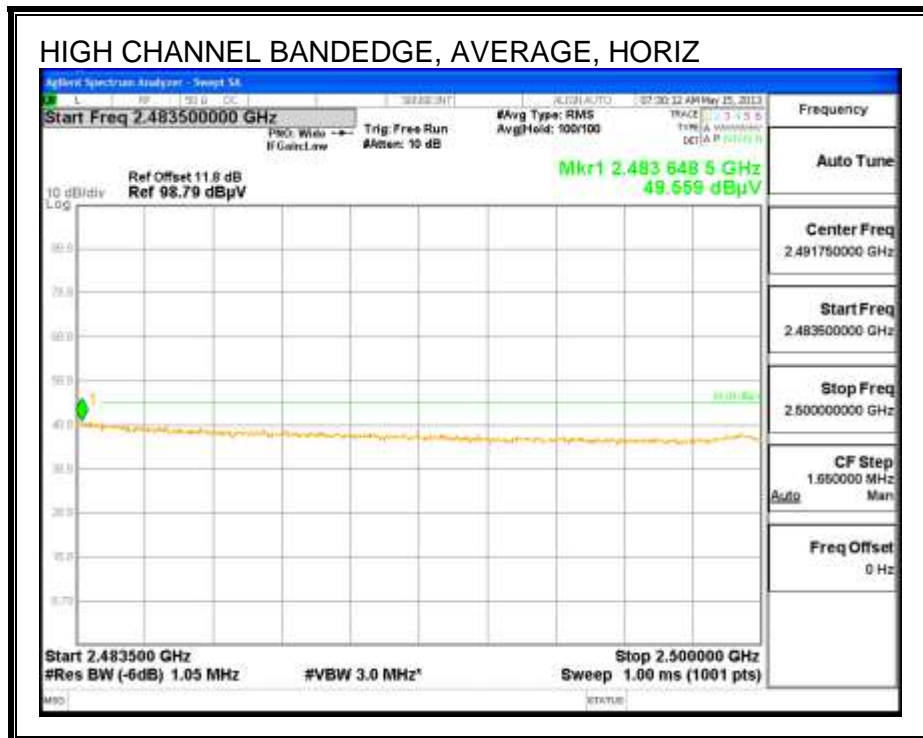
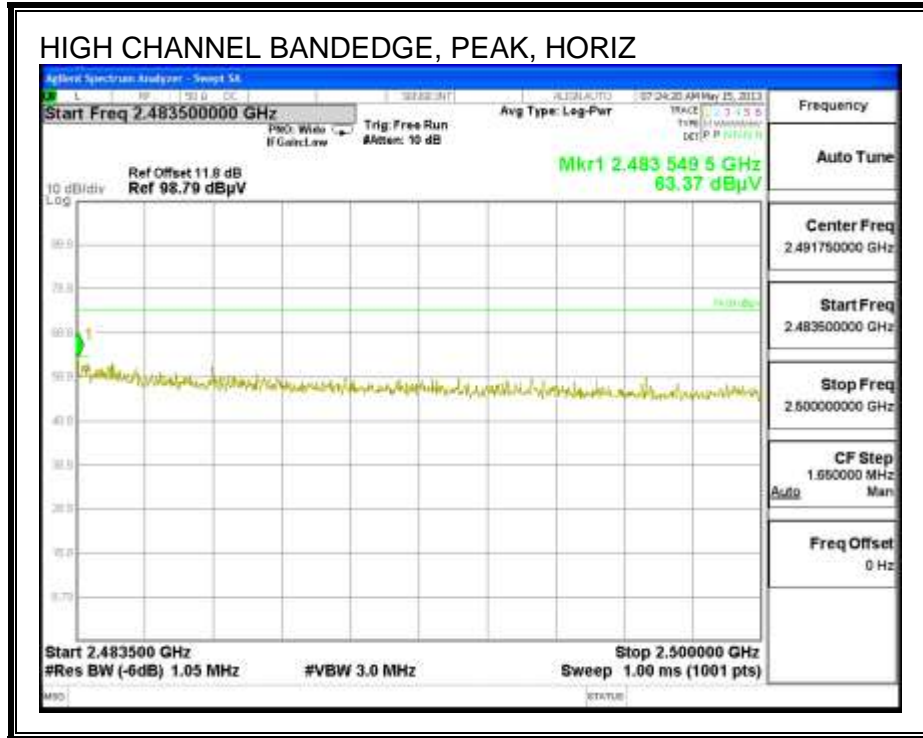
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:B mode_2462														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	2860.105	41.84	PK	32.9	-35.2	5.1	0.9	45.54	53.97	-8.43	74	-28.46	100	Horz
2	5705.471	38.23	PK	35.1	-34.9	7.7	0.2	46.33	53.97	-7.64	74	-27.67	200	Horz
3	6941.294	37.19	PK	35.9	-35	8.6	0.3	46.99	53.97	-6.98	74	-27.01	100	Horz
Vertical 1000 - 18000MHz														
4	3475.893	40.99	PK	33.2	-35	5.7	0.4	45.29	53.97	-8.68	74	-28.71	100	Vert
5	4945.291	38.63	PK	34.6	-34.9	7.2	0.2	45.73	53.97	-8.24	74	-28.27	200	Vert
6	11544.841	34.39	PK	38.8	-33.6	11.3	0.5	51.39	53.97	-2.58	74	-22.61	200	Vert
Horizontal 10000 - 18000MHz														
7	13252.374	25.37	PK	39.1	-31.9	12.2	0.4	45.17	53.97	-8.8	74	-28.83	100	Horz
Vertical 10000 - 18000MHz														
8	11663.168	25.54	PK	38.9	-33.5	11.4	0.6	42.94	53.97	-11.03	74	-31.06	100	Vert
PK - Peak detector														
Av - Average detector														

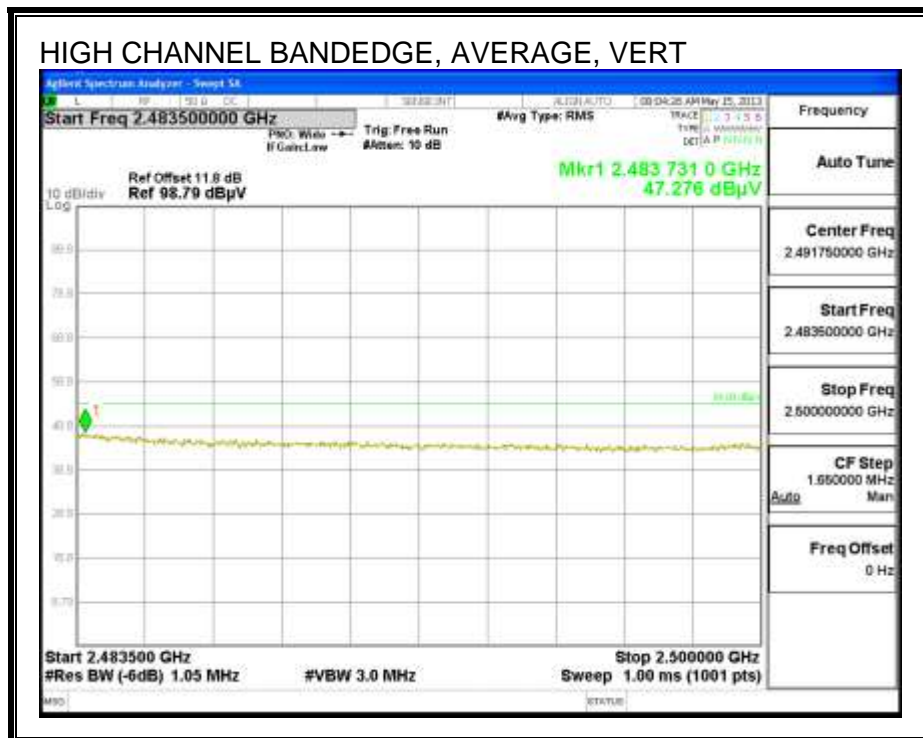
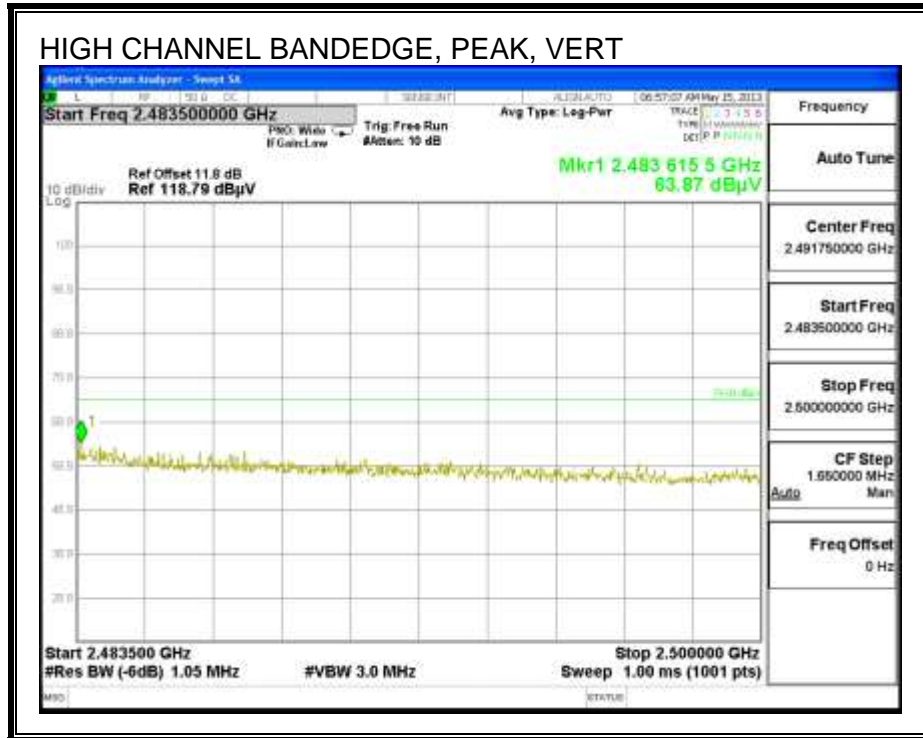
8.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





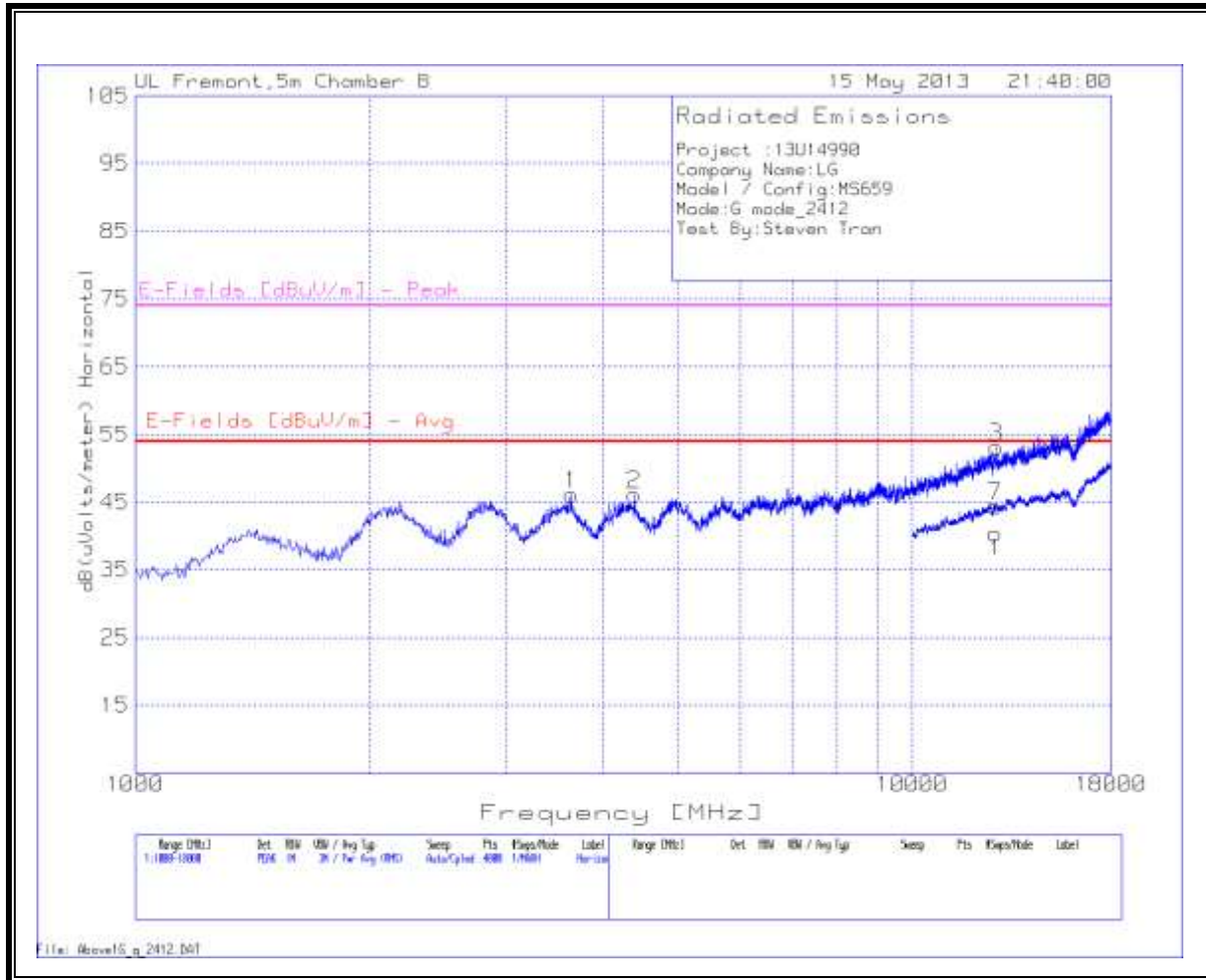
AUTHORIZED BANDEDGE (HIGH CHANNEL)





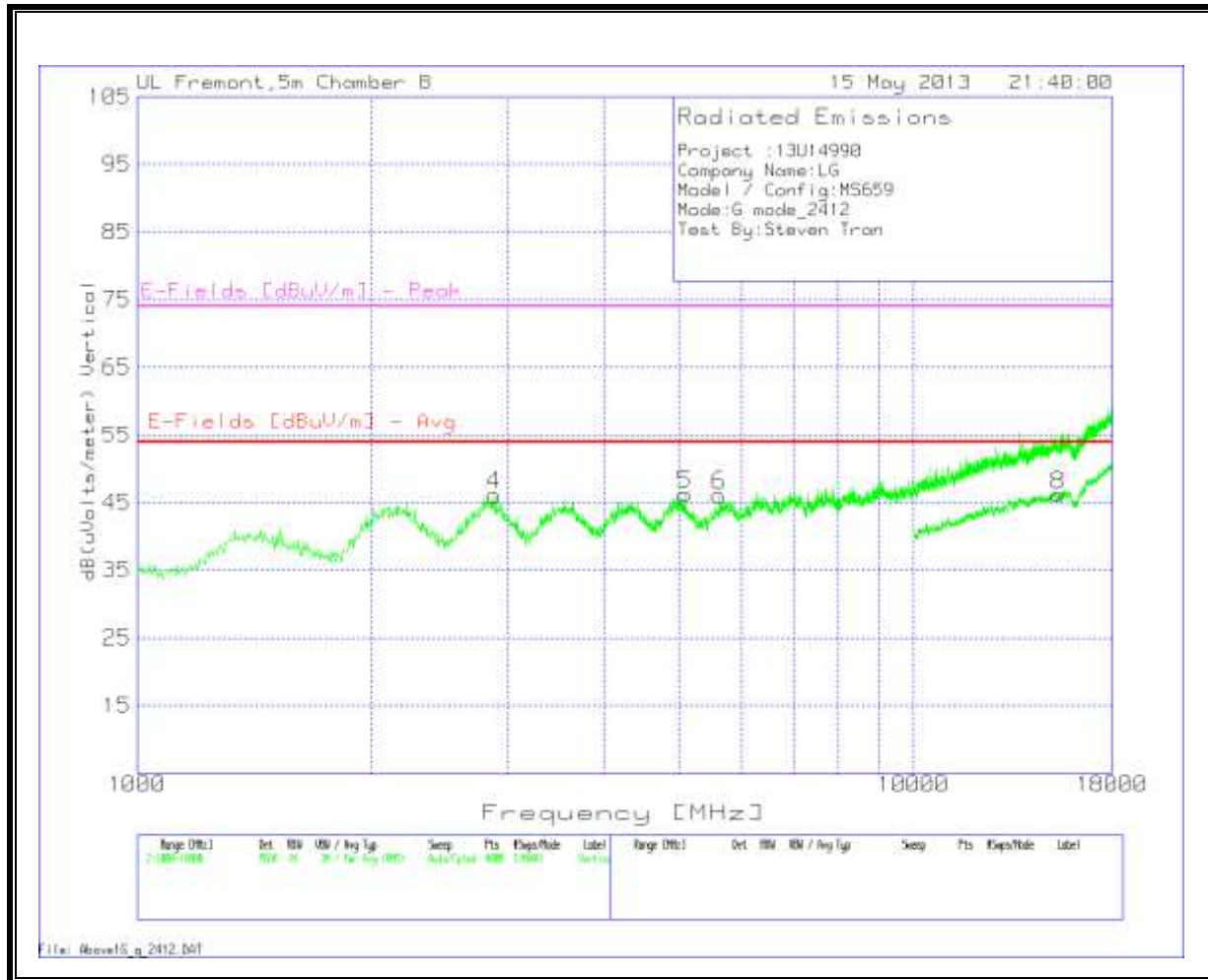
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

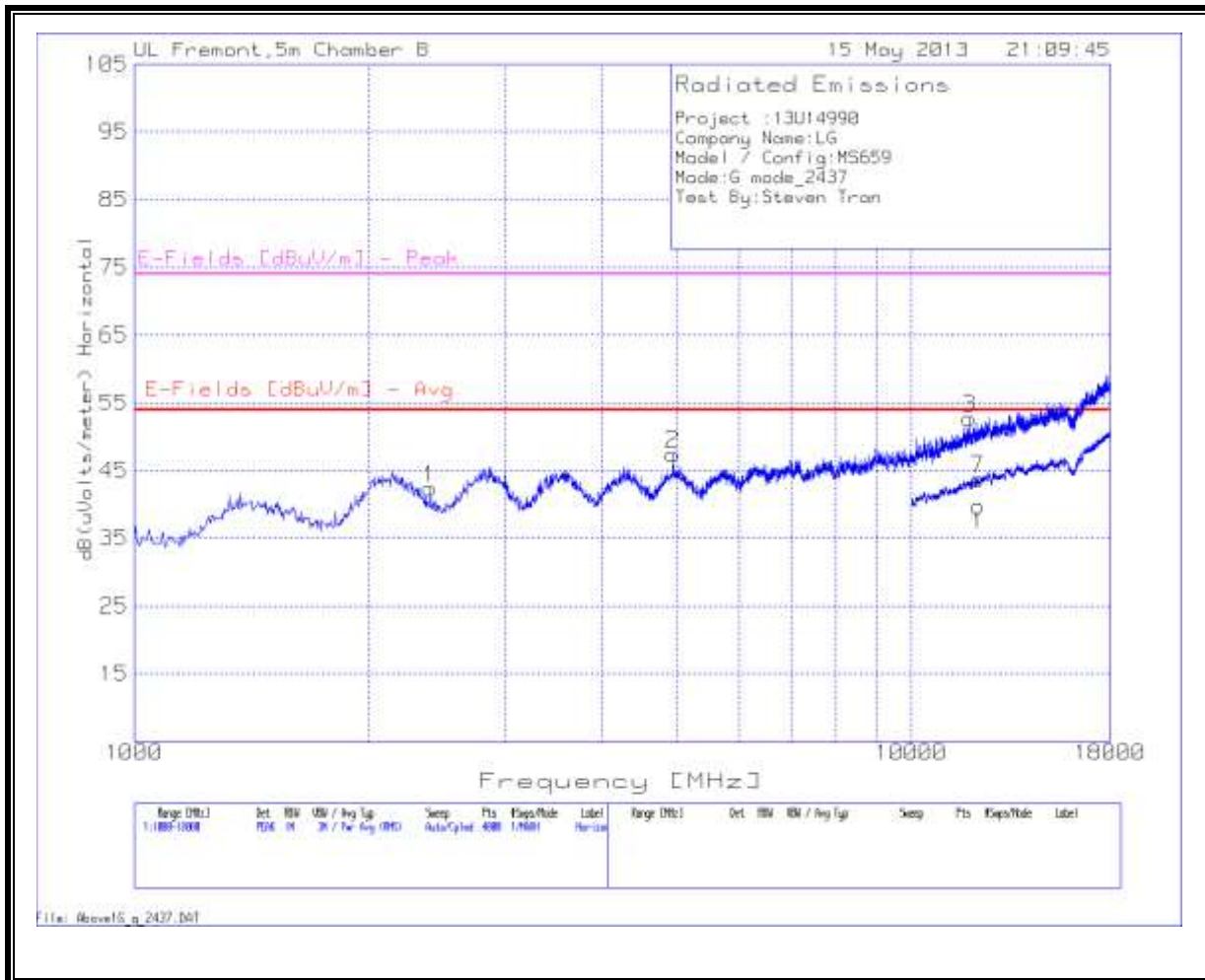


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

LOW CHANNEL DATA

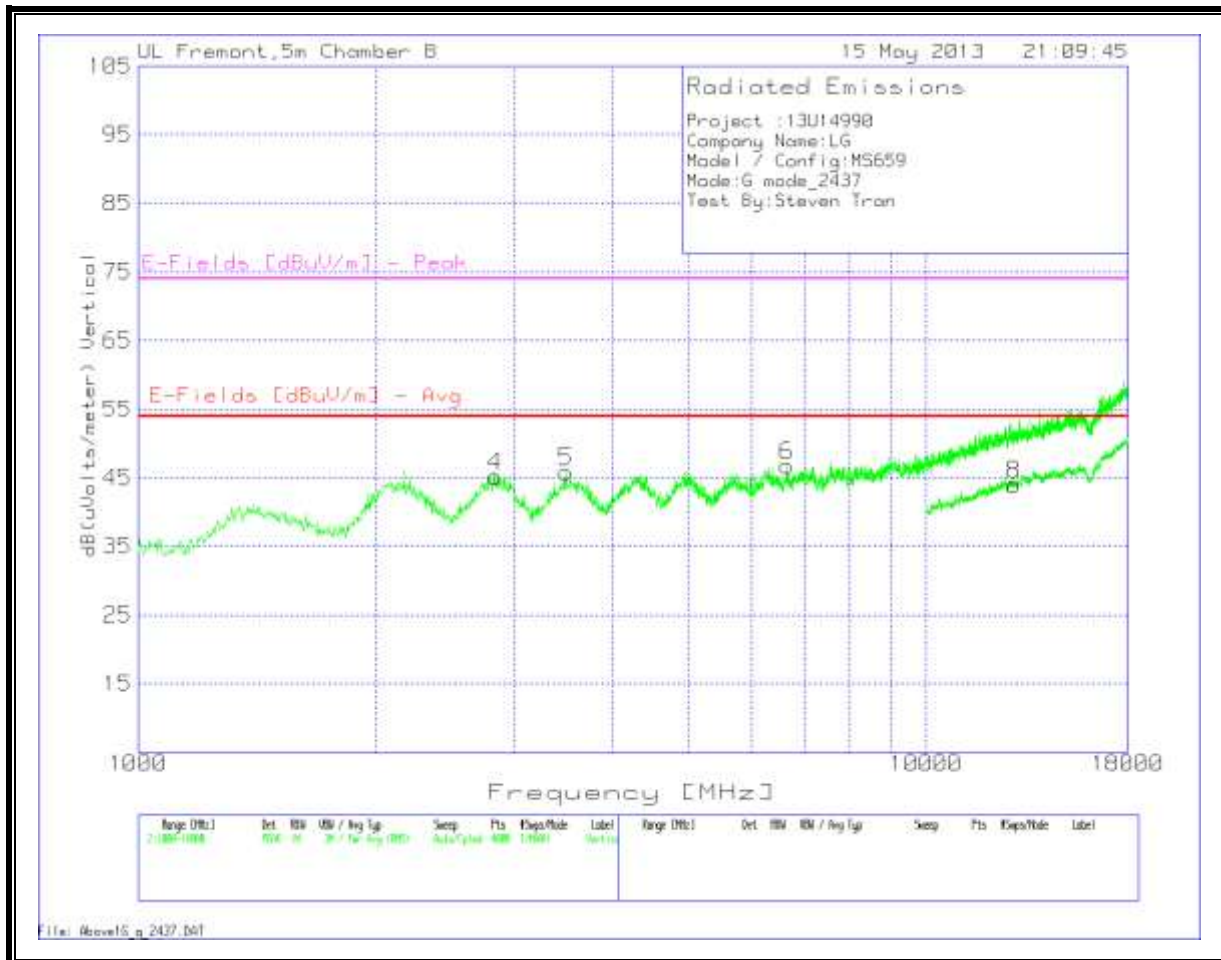
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:G mode_2412														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BR F [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	3641.519	41.28	PK	33.5	-35	5.9	0.4	46.08	53.97	-7.89	74	-27.92	100	Horz
2	4393.205	39.8	PK	34.3	-34.9	6.6	0.3	46.1	53.97	-7.87	74	-27.9	200	Horz
3	12835.873	33.57	PK	39.2	-32	12	0.4	53.17	53.97	-0.8	74	-20.83	200	Horz
Vertical 1000 - 18000MHz														
4	2885.586	42.32	PK	33	-35.2	5.1	0.9	46.12	53.97	-7.85	74	-27.88	200	Vert
5	5081.189	38.9	PK	34.7	-34.9	7.3	0.2	46.2	53.97	-7.77	74	-27.8	100	Vert
6	5624.781	38.06	PK	35	-34.9	7.7	0.2	46.06	53.97	-7.91	74	-27.94	200	Vert
Horizontal 10000 - 18000MHz														
7	12798.601	24.78	PK	39.2	-32.1	12	0.5	44.38	53.97	-9.59	74	-29.62	100	Horz
Vertical 10000 - 18000MHz														
8	15369.315	24.67	PK	40.6	-32.9	13.4	0.4	46.17	53.97	-7.8	74	-27.83	200	Vert
PK - Peak detector														
Av - Average detector														

MID CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

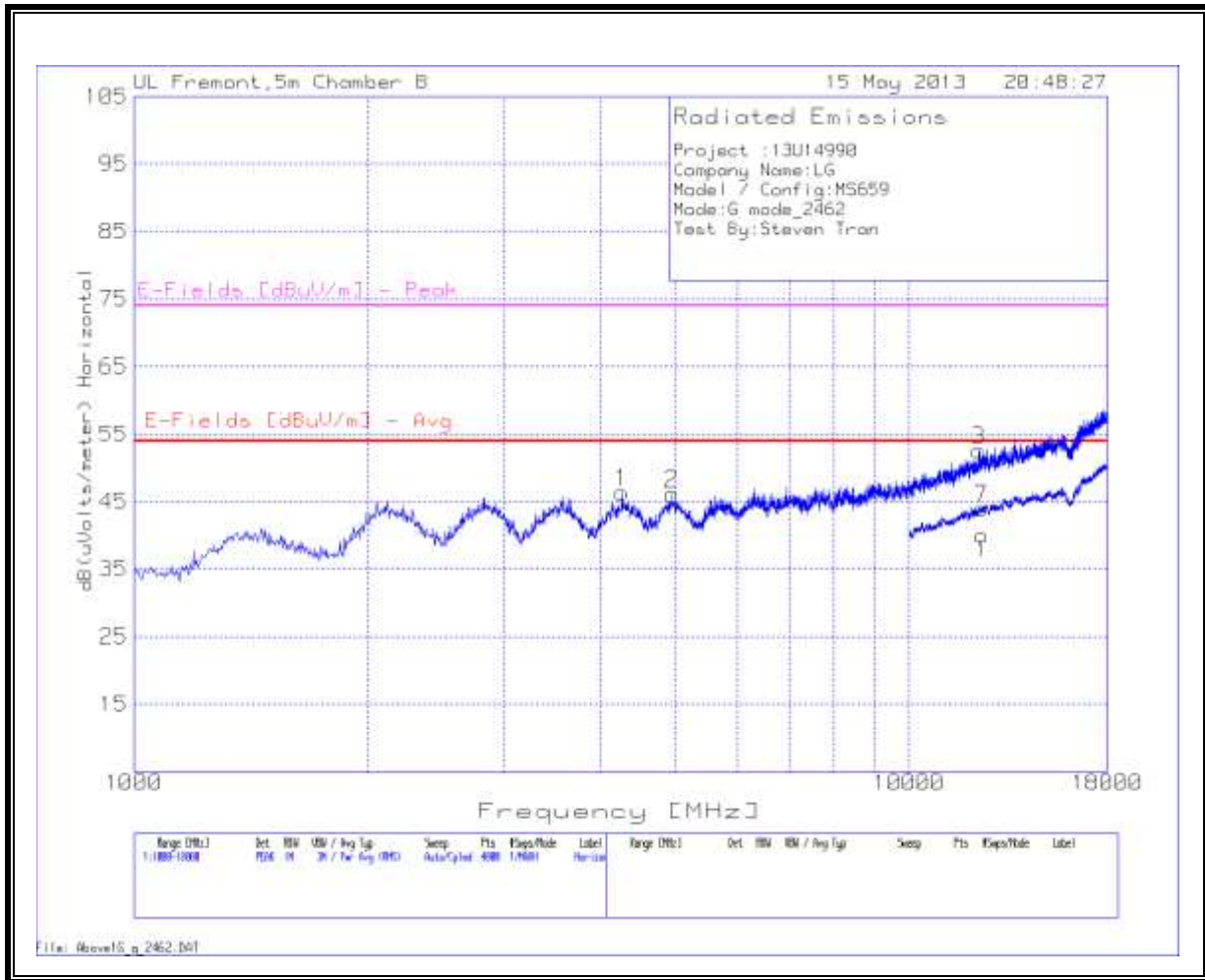


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

MID CHANNEL DATA

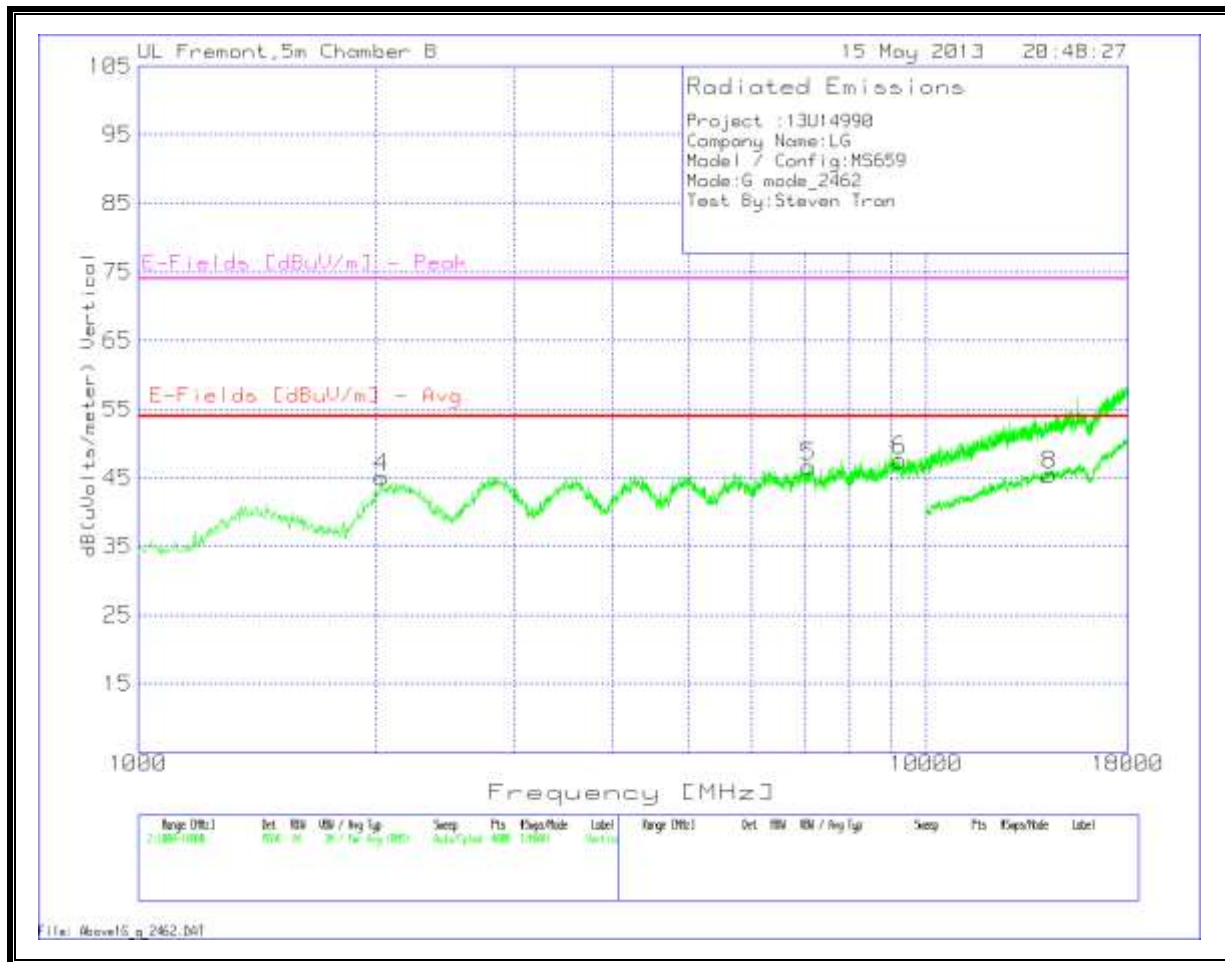
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:G mode_2437														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	2405.696	39.54	PK	32.3	-35	4.6	0.9	42.34	53.97	-11.63	74	-31.66	200	Horz
2	4936.797	40.34	PK	34.6	-34.9	7.2	0.2	47.44	53.97	-6.53	74	-26.56	200	Horz
3	11863.35	35.21	PK	39.1	-33.4	11.5	0.3	52.71	53.97	-1.26	74	-21.29	200	Horz
Vertical 1000 - 18000MHz														
4	2843.118	41.62	PK	32.9	-35.2	5.1	0.8	45.22	53.97	-8.75	74	-28.78	200	Vert
5	3492.88	41.45	PK	33.2	-35	5.7	0.5	45.85	53.97	-8.12	74	-28.15	100	Vert
6	6652.511	37.27	PK	35.8	-35	8.4	0.3	46.77	53.97	-7.2	74	-27.23	100	Vert
Horizontal 10000 - 18000MHz														
7	12178.91	25.17	PK	39.2	-33.1	11.6	0.8	43.67	53.97	-10.3	74	-30.33	100	Horz
Vertical 10000 - 18000MHz														
8	12942.53	24.24	PK	39.2	-31.9	12.1	0.4	44.04	53.97	-9.93	74	-29.96	200	Vert
PK - Peak detector														
Av - Average detector														

HIGH CHANNEL
HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

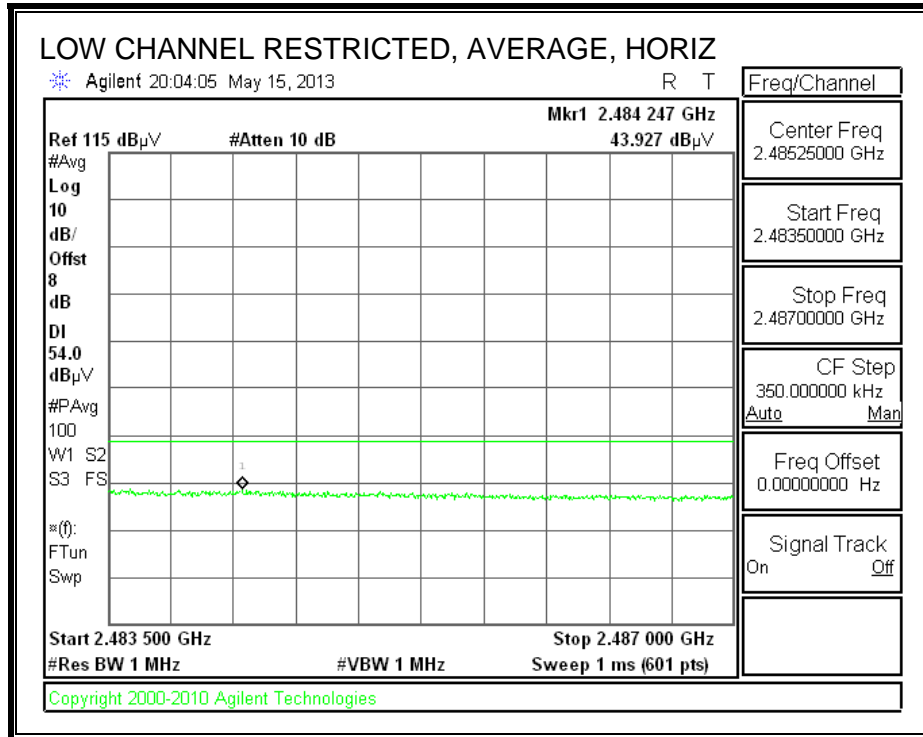
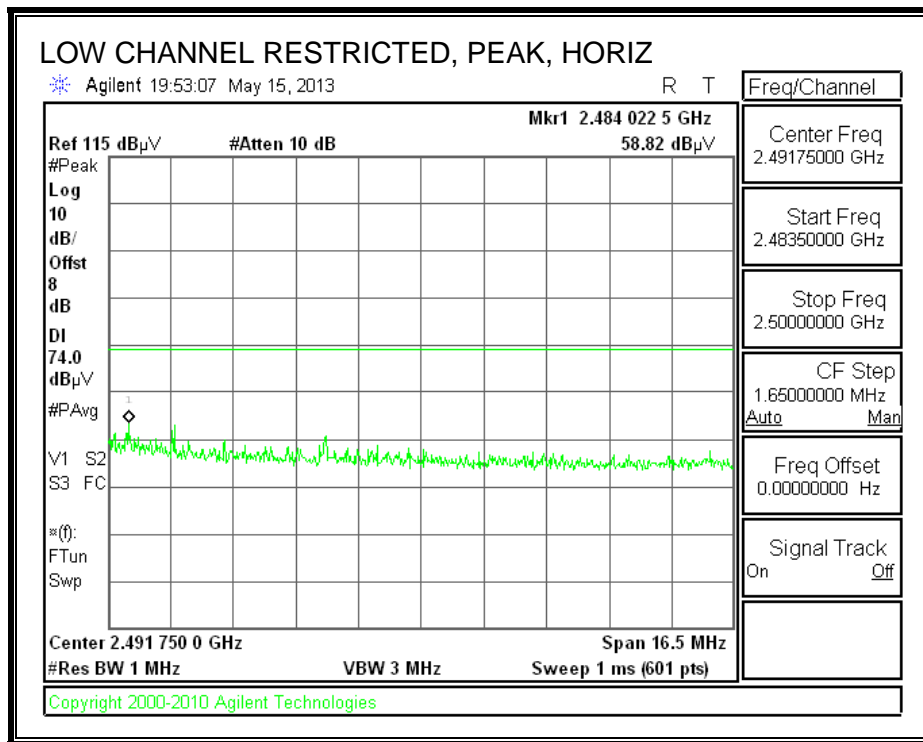


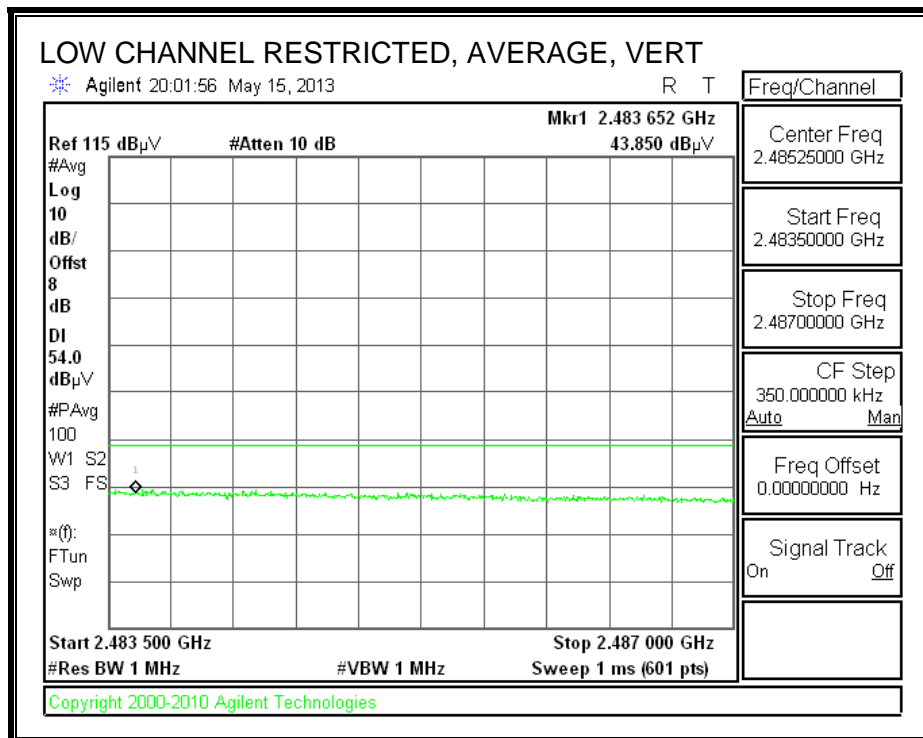
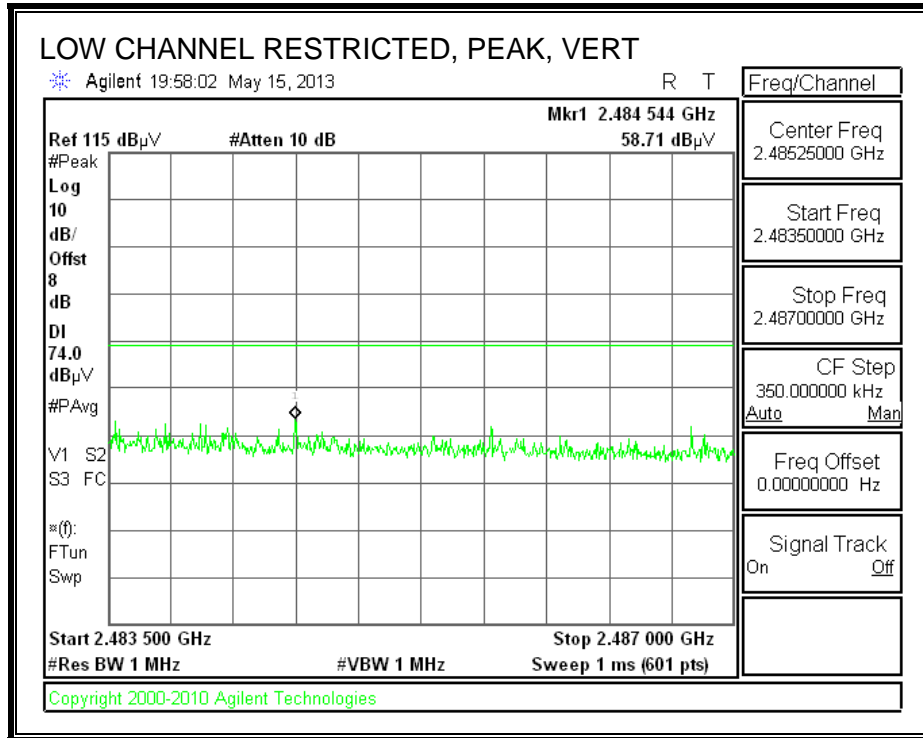
Note: Additional line displayed in the graph from 1-18GHz is average measurement.

HIGH CHANNEL DATA

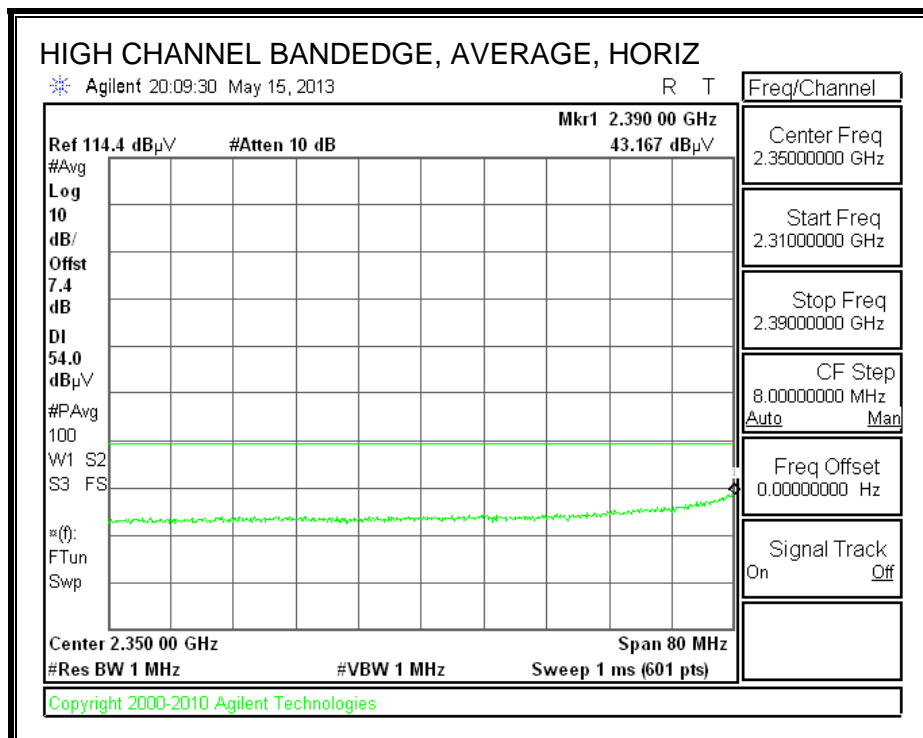
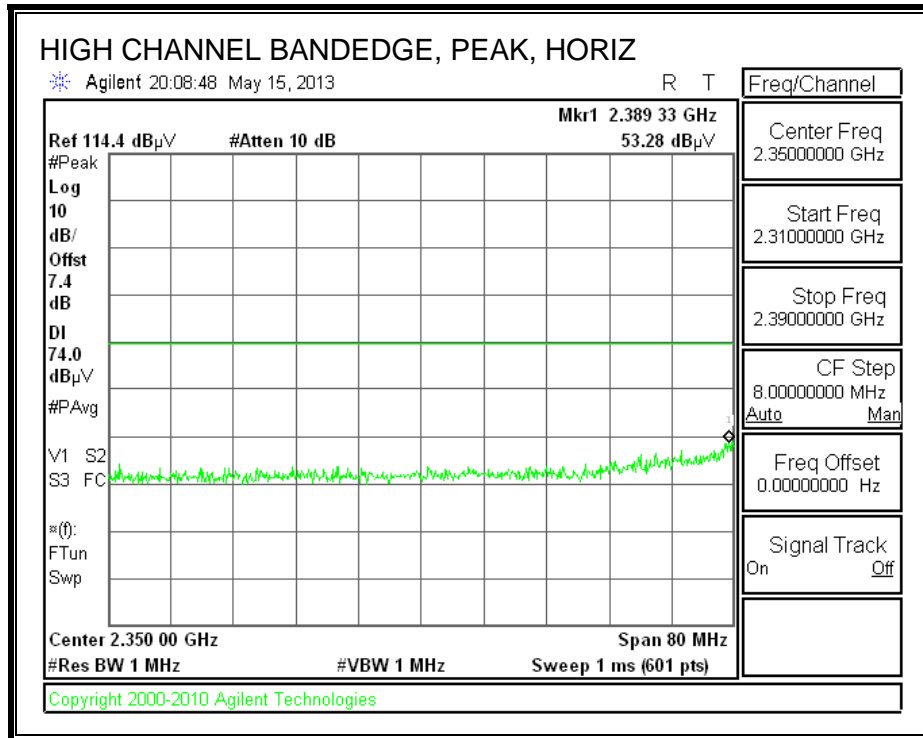
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:G mode_2462														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	4261.554	40.36	PK	34.1	-34.8	6.5	0.2	46.36	53.97	-7.61	74	-27.64	100	Horz
2	4945.291	39.05	PK	34.6	-34.9	7.2	0.2	46.15	53.97	-7.82	74	-27.85	100	Horz
3	12305.021	34.05	PK	39.2	-32.9	11.7	0.5	52.55	53.97	-1.42	74	-21.45	200	Horz
Vertical 1000 - 18000MHz														
4	2036.223	43.2	PK	31.8	-35	4.2	0.9	45.1	53.97	-8.87	74	-28.9	100	Vert
5	7102.673	36.7	PK	35.9	-35	8.7	0.3	46.6	53.97	-7.37	74	-27.4	200	Vert
6	9260.055	35.38	PK	36.9	-35.2	10	0.5	47.58	53.97	-6.39	74	-26.42	200	Vert
Horizontal 10000 - 18000MHz														
7	12406.797	25.34	PK	39.2	-32.7	11.8	0.4	44.04	53.97	-9.93	74	-29.96	200	Horz
Vertical 10000 - 18000MHz														
8	14345.827	25.02	PK	39.6	-32.4	12.8	0.4	45.42	53.97	-8.55	74	-28.58	200	Vert
PK - Peak detector														
Av - Average detector														

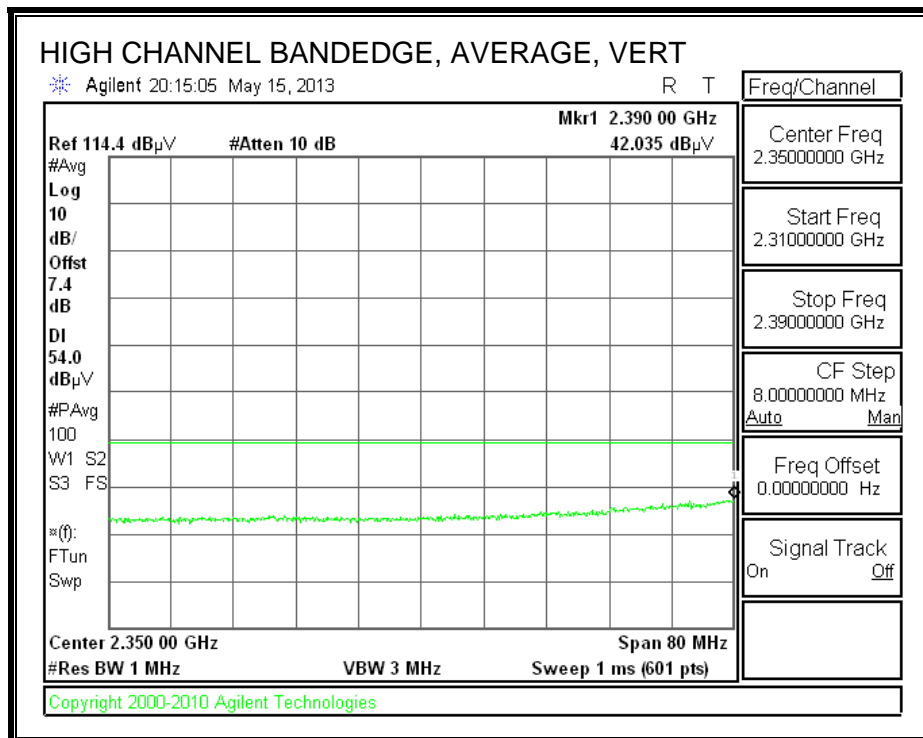
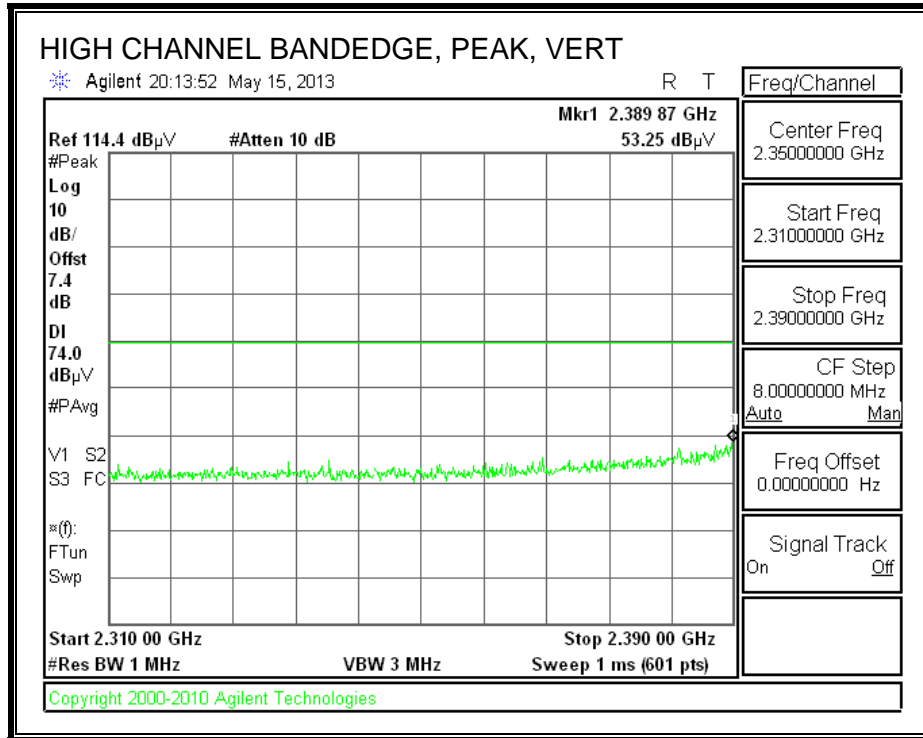
8.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)





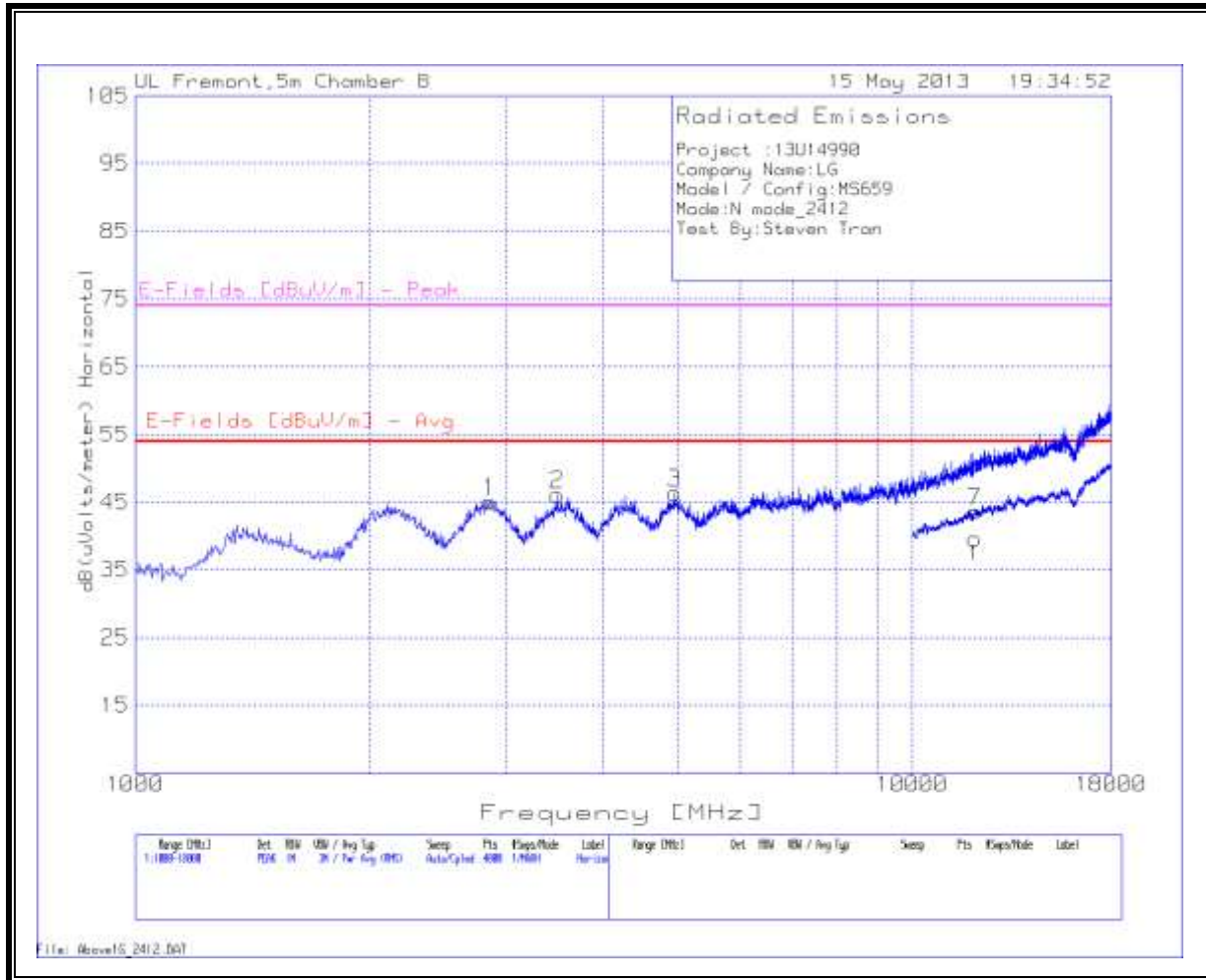
AUTHORIZED BANDEDGE (HIGH CHANNEL)





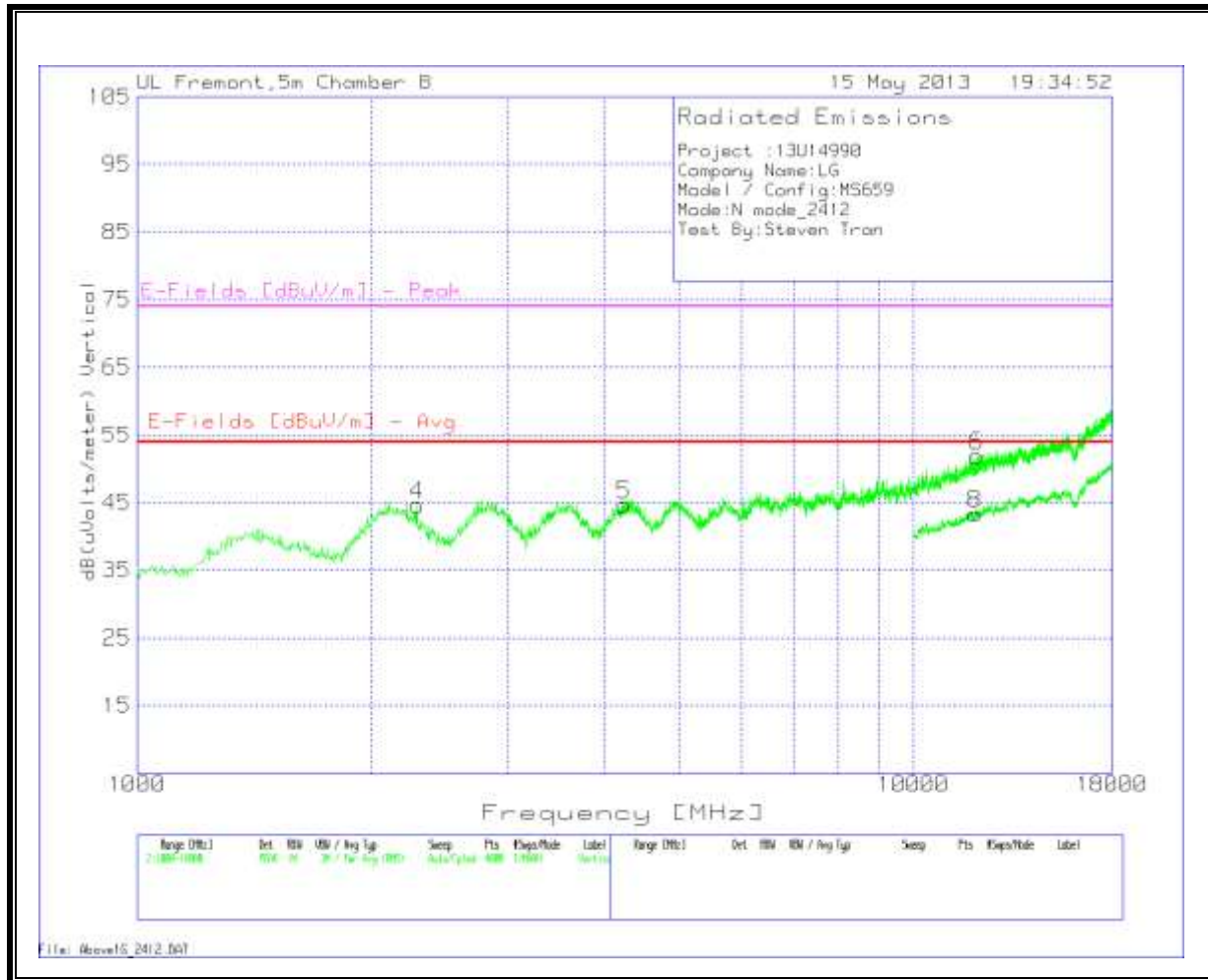
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

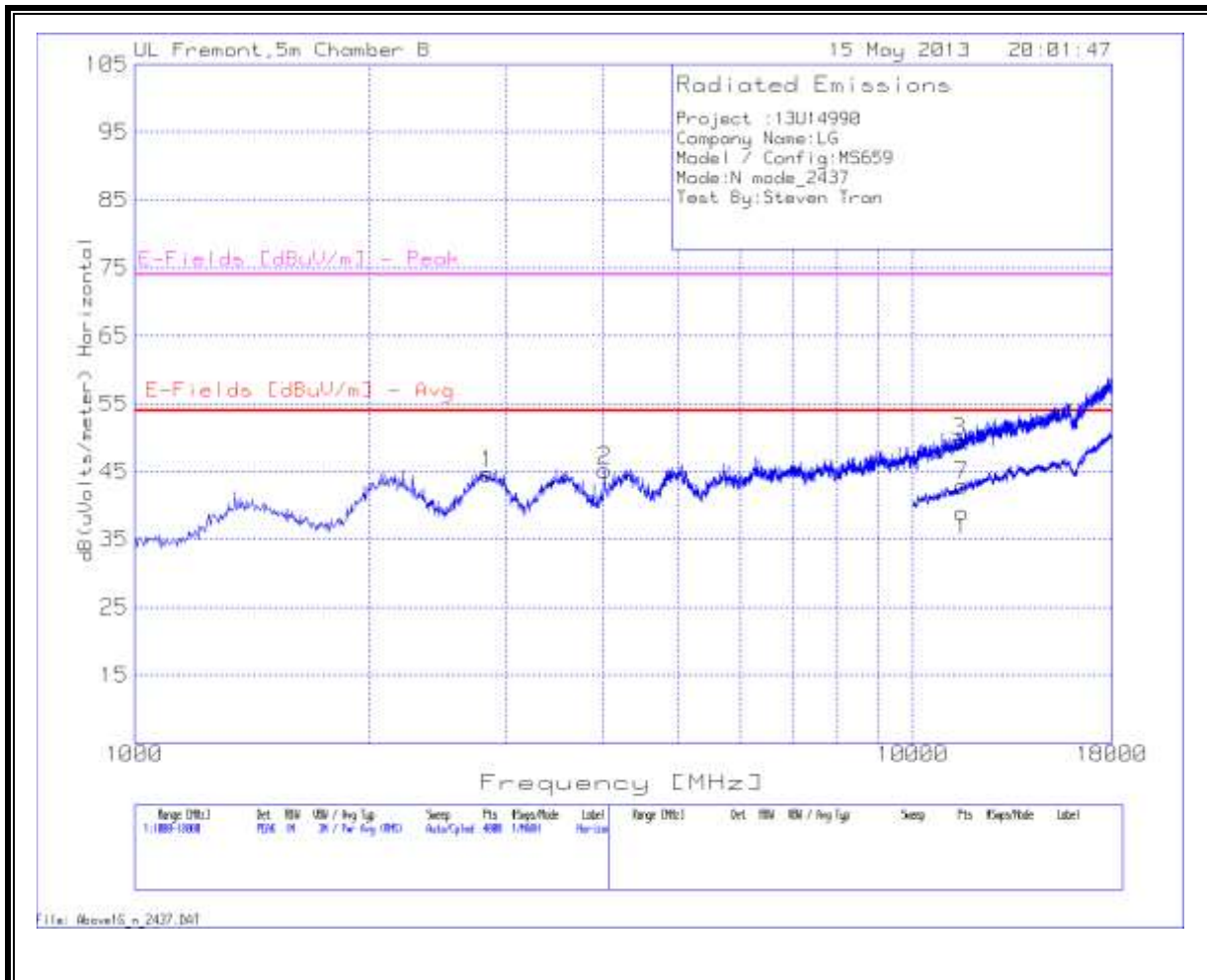


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

LOW CHANNEL DATA

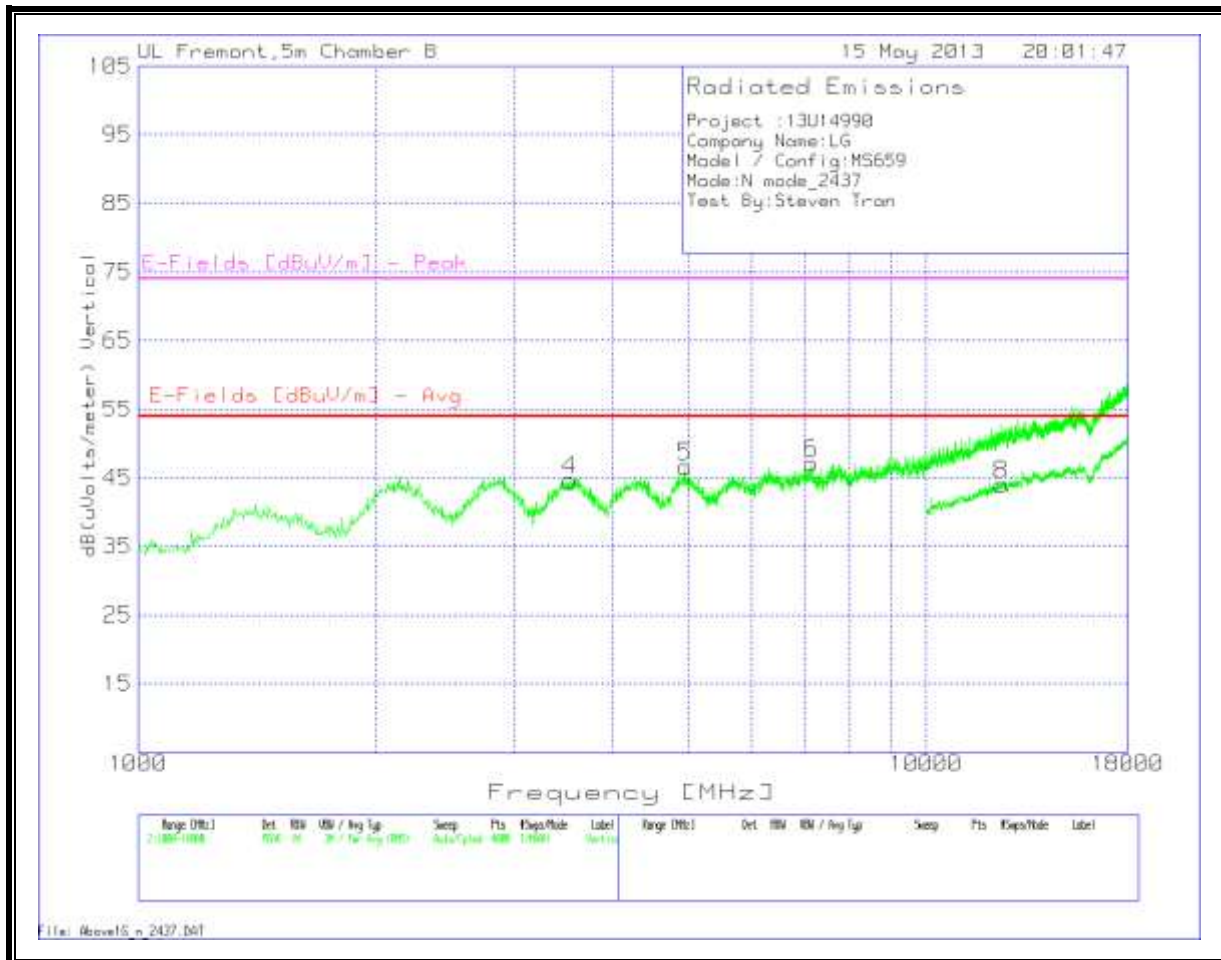
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:N mode_2412														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BR [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	2864.352	41.38	PK	32.9	-35.2	5.1	0.9	45.08	53.97	-8.89	74	-28.92	100	Horz
2	3497.127	41.66	PK	33.2	-35	5.7	0.5	46.06	53.97	-7.91	74	-27.94	100	Horz
3	4945.291	39.24	PK	34.6	-34.9	7.2	0.2	46.34	53.97	-7.63	74	-27.66	100	Horz
Vertical 1000 - 18000MHz														
4	2295.279	42.04	PK	32.2	-35	4.5	0.9	44.64	53.97	-9.33	74	-29.36	200	Vert
5	4244.567	38.65	PK	34.1	-34.8	6.5	0.2	44.65	53.97	-9.32	74	-29.35	200	Vert
6	12054.459	33.58	PK	39.2	-33.3	11.6	0.8	51.88	53.97	-2.09	74	-22.12	200	Vert
Horizontal 10000 - 18000MHz														
7	12018.991	25.45	PK	39.2	-33.3	11.6	0.6	43.55	53.97	-10.42	74	-30.45	200	Horz
Vertical 10000 - 18000MHz														
8	12014.993	25.5	PK	39.2	-33.3	11.6	0.3	43.3	53.97	-10.67	74	-30.7	100	Vert
PK - Peak detector														
Av - Average detector														

MID CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL

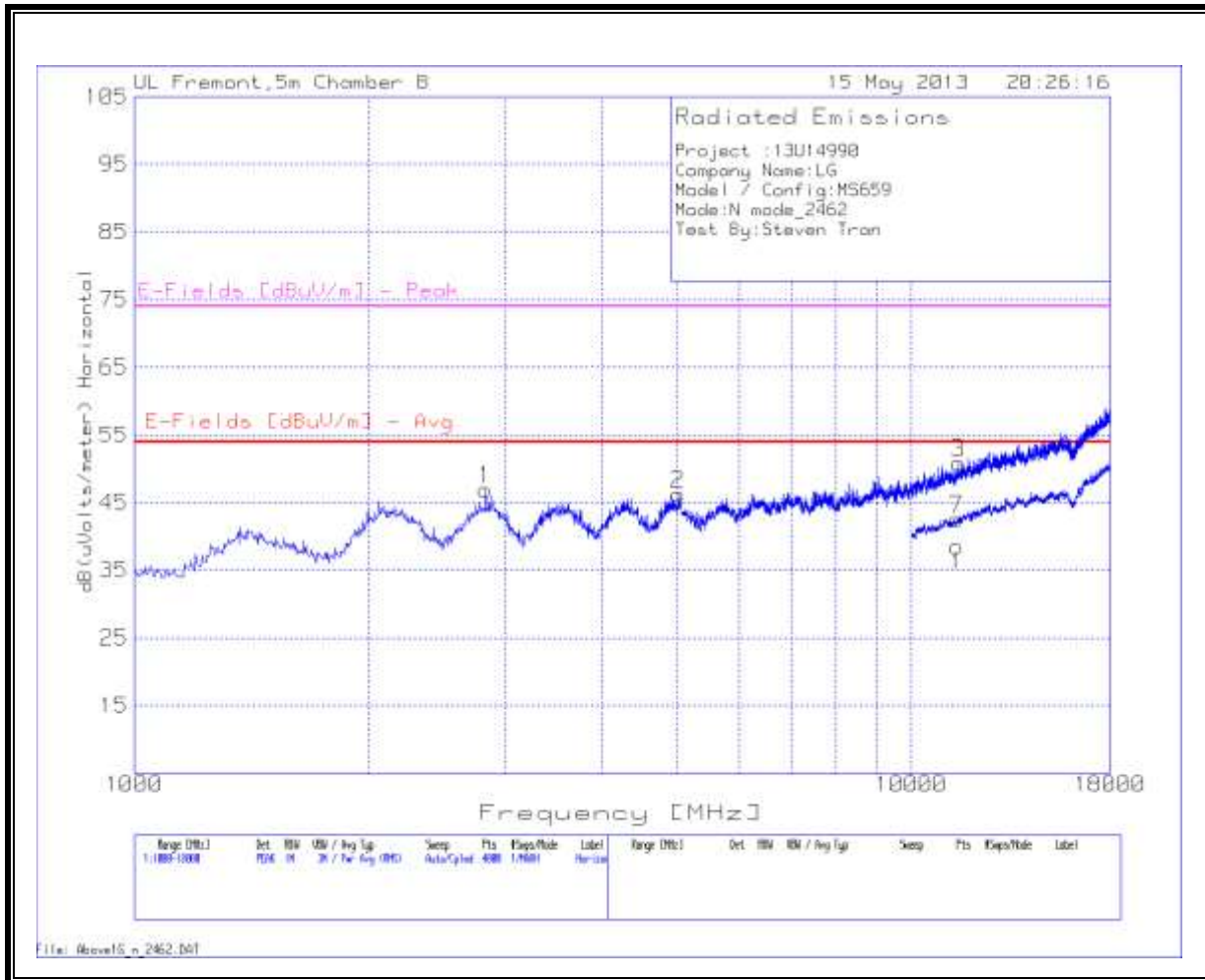


Note: Additional line displayed in the graph from 1-18GHz is average measurement.

MID CHANNEL DATA

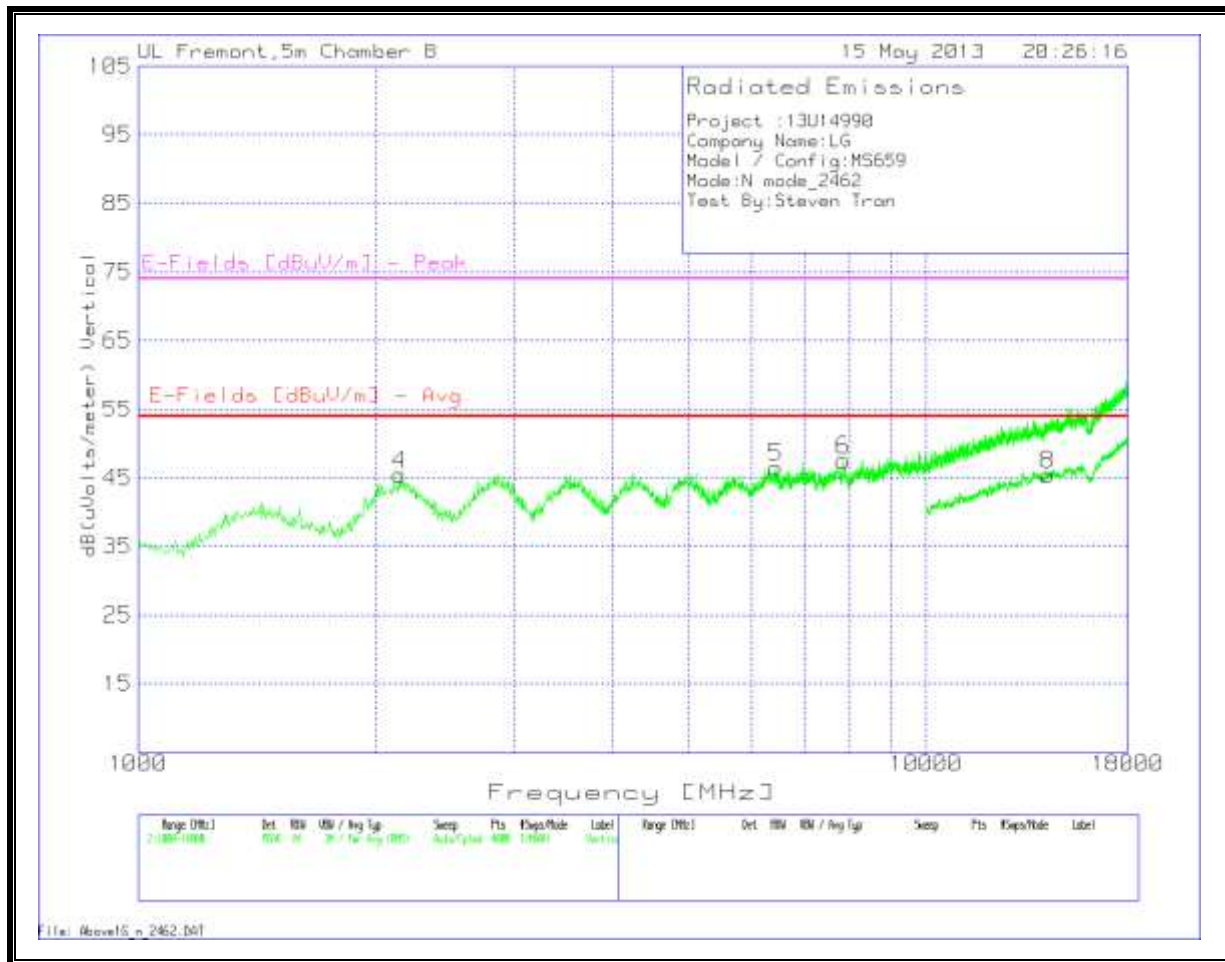
Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:N mode_2437														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVols/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	2843.118	41.02	PK	32.9	-35.2	5.1	0.8	44.62	53.97	-9.35	74	-29.38	100	Horz
2	4019.485	39.51	PK	33.9	-34.8	6.3	0.3	45.21	53.97	-8.76	74	-28.79	200	Horz
3	11459.905	32.36	PK	38.7	-33.6	11.3	0.6	49.36	53.97	-4.61	74	-24.64	200	Horz
Vertical 1000 - 18000MHz														
4	3526.855	40.09	PK	33.3	-35	5.8	0.5	44.69	53.97	-9.28	74	-29.31	100	Vert
5	4941.044	39.48	PK	34.6	-34.9	7.2	0.2	46.58	53.97	-7.39	74	-27.42	100	Vert
6	7149.388	37.32	PK	35.8	-35	8.8	0.2	47.12	53.97	-6.85	74	-26.88	100	Vert
Horizontal 10000 - 18000MHz														
7	11559.22	25.74	PK	38.8	-33.6	11.3	0.7	42.94	53.97	-11.03	74	-31.06	200	Horz
Vertical 10000 - 18000MHz														
8	12450.775	24.95	PK	39.2	-32.6	11.8	0.6	43.95	53.97	-10.02	74	-30.05	200	Vert
PK - Peak detector														
Av - Average detector														

HIGH CHANNEL
 HORIZONTAL



Note: Additional line displayed in the graph from 1-18GHz is average measurement.

VERTICAL



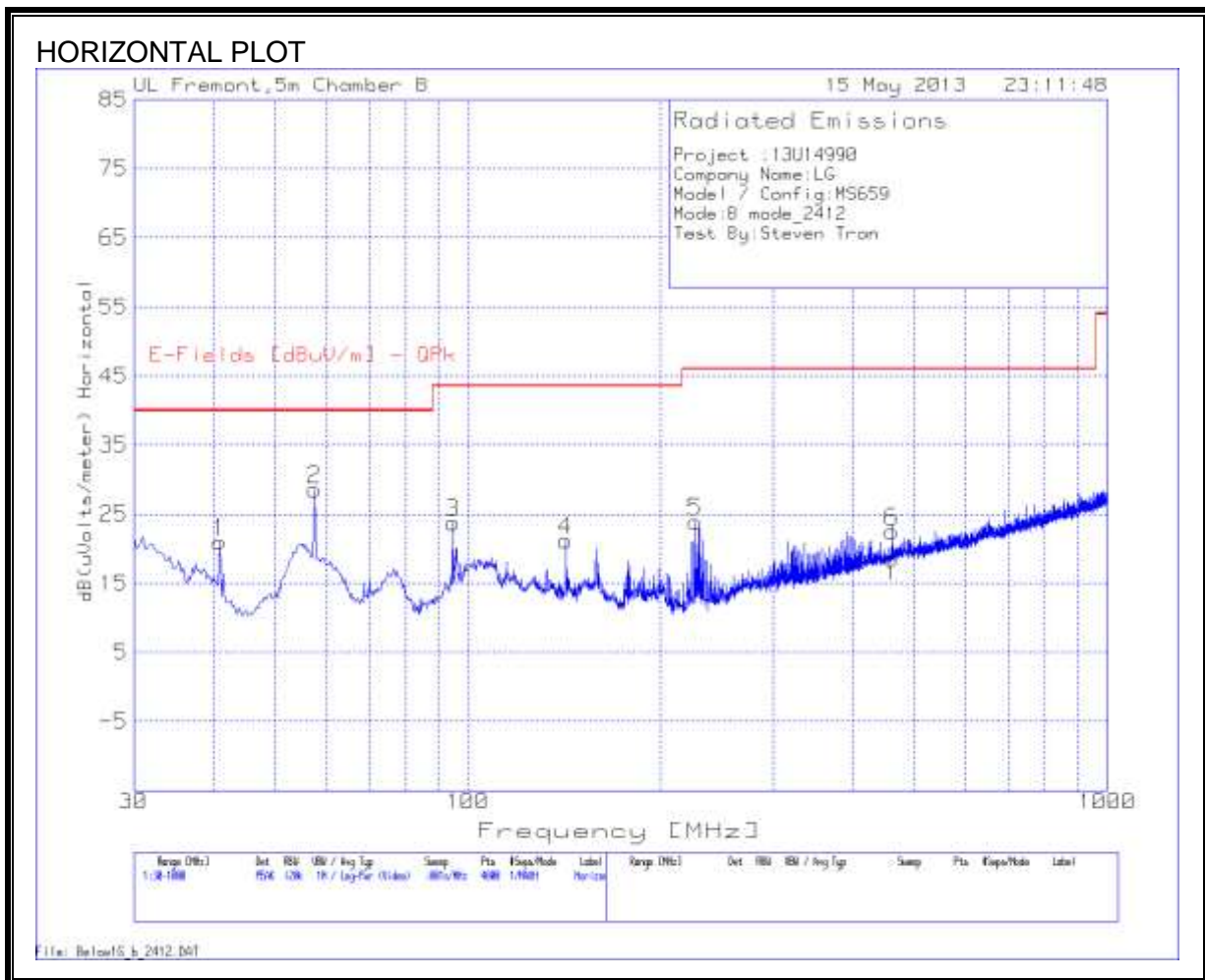
Note: Additional line displayed in the graph from 1-18GHz is average measurement.

HIGH CHANNEL DATA

Project :13U14990														
Company Name:LG														
Model / Config:MS659														
Mode:N mode_2462														
Test By:Steven Tran														
Marker No.	Test Frequency	Meter Reading	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	2834.624	43.18	PK	32.9	-35.2	5.1	0.9	46.88	53.97	-7.09	74	-27.12	100	Horz
2	5013.24	39.11	PK	34.6	-34.9	7.2	0.2	46.21	53.97	-7.76	74	-27.79	100	Horz
3	11493.88	33.85	PK	38.7	-33.6	11.3	0.6	50.85	53.97	-3.12	74	-23.15	200	Horz
Vertical 1000 - 18000MHz														
4	2146.64	43.11	PK	32	-35	4.4	0.9	45.41	53.97	-8.56	74	-28.59	100	Vert
5	6448.664	37.03	PK	35.9	-35	8.3	0.3	46.53	53.97	-7.44	74	-27.47	200	Vert
6	7858.606	36.93	PK	36.2	-35.1	9.2	0.3	47.53	53.97	-6.44	74	-26.47	200	Vert
Horizontal 10000 - 18000MHz														
7	11443.278	25.58	PK	38.7	-33.7	11.2	0.7	42.48	53.97	-11.49	74	-31.52	100	Horz
Vertical 10000 - 18000MHz														
8	14265.867	25.14	PK	39.5	-32.4	12.8	0.4	45.44	53.97	-8.53	74	-28.56	200	Vert
PK - Peak detector														
Av - Average detector														

8.3. WORST-CASE BELOW 1 GHz

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



HORIZONTAL DATA

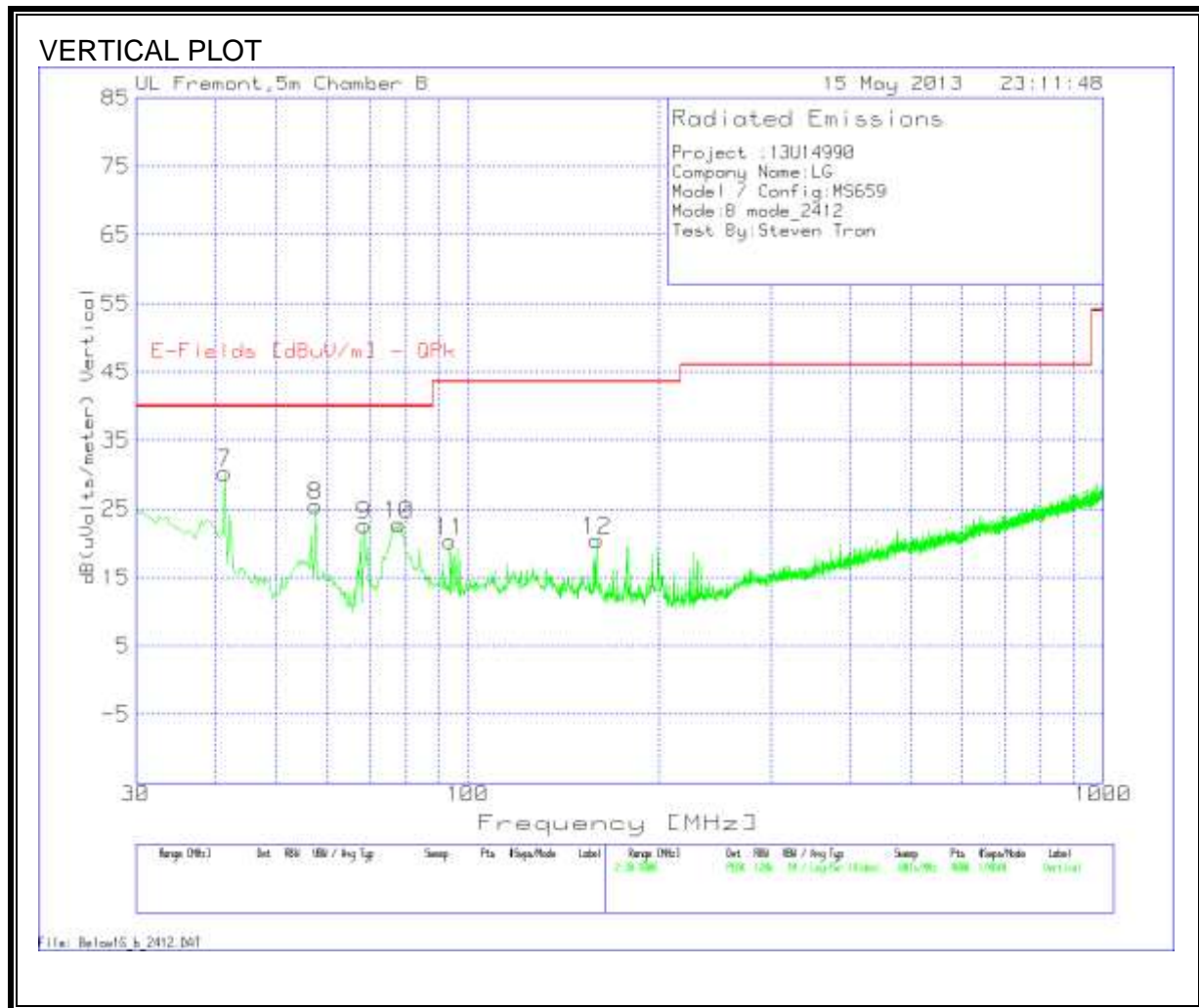
Project : 13U14990										
Company Name: LG										
Model / Config: MS659										
Mode: B mode_2412										
Test By: Steven Tran										

Marker No.	Test Frequency	Meter Reading	Detector	T243 Antenna Factor dB/m	T10 preamp/ Cable loss [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - QPk	Margin (dB)	Height [cm]	Polarity
Horizontal 30 - 1000MHz										
1	40.9043	37.19	PK	12.8	-29	20.99	40	-19.01	300	Horz
2	57.6243	50.51	PK	6.9	-28.8	28.61	40	-11.39	400	Horz
3	94.699	43.59	PK	8.6	-28.4	23.79	43.52	-19.73	300	Horz
4	142.4357	36.41	PK	12.7	-27.9	21.21	43.52	-22.31	300	Horz
5	227.0047	40	PK	10.9	-27	23.9	46.02	-22.12	100	Horz
6	460.5996	32	PK	17	-26.5	22.5	46.02	-23.52	100	Horz

PK - Peak detector

Av - Average detector

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



VERTICAL DATA

Project : 13U14990										
Company Name: LG										
Model / Config: MS659										
Mode: B mode_2412										
Test By: Steven Tran										

Marker No.	Test Frequency	Meter Reading	Detector	T243 Antenna Factor dB/m	T10 preamp/ Cable loss [dB]	dB(uVolts/meter)	E-Fields [dBuV/m] - QPk	Margin (dB)	Height [cm]	Polarity
al 30 - 1000MHz										
7	41.389	46.88	PK	12.4	-29	30.28	40	-9.72	200	Vert
8	57.6243	47.41	PK	6.9	-28.8	25.51	40	-14.49	300	Vert
9	68.7709	43.52	PK	7.8	-28.7	22.62	40	-17.38	300	Vert
10	77.979	43.76	PK	7.6	-28.6	22.76	40	-17.24	200	Vert
11	93.7297	40.4	PK	8.3	-28.4	20.3	43.52	-23.22	200	Vert
12	159.8826	35.9	PK	12.1	-27.6	20.4	43.52	-23.12	200	Vert

PK - Peak detector
 Av - Average detector