



FCC 47 CFR PART 15 SUBPART C

**C2PC CERTIFICATION TEST REPORT
FOR**

**CDMA/WCDMA/LTE Phone + Bluetooth &
WLAN 2.4GHz and NFC**

MODEL NUMBER: LG-LS740, LGLS740, LS740

FCC ID: ZNFLS740

REPORT NUMBER: 14U16944-2

ISSUE DATE: JANUARY 27, 2014

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: CDMA/LTE Phone + Bluetooth & WLAN 2.4GHz and NFC

MODEL: LG-LS740, LGLS740, LS740

SERIAL NUMBER: 1801185

DATE TESTED: JANUARY 21 - 27, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	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.

STEVEN TRAN
WiSE LAB TECHNICIAN
UL Verification Services Inc.

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.

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 18000 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 CDMA/LTE Phone Bluetooth, WLAN(2.4GHz) and NFC

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	9.02	7.98
2402 - 2480	Enhanced 8PSK	8.94	7.83

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 8.6.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1 dBi.

5.4. 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,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WD	DB83Y00000030	N/A

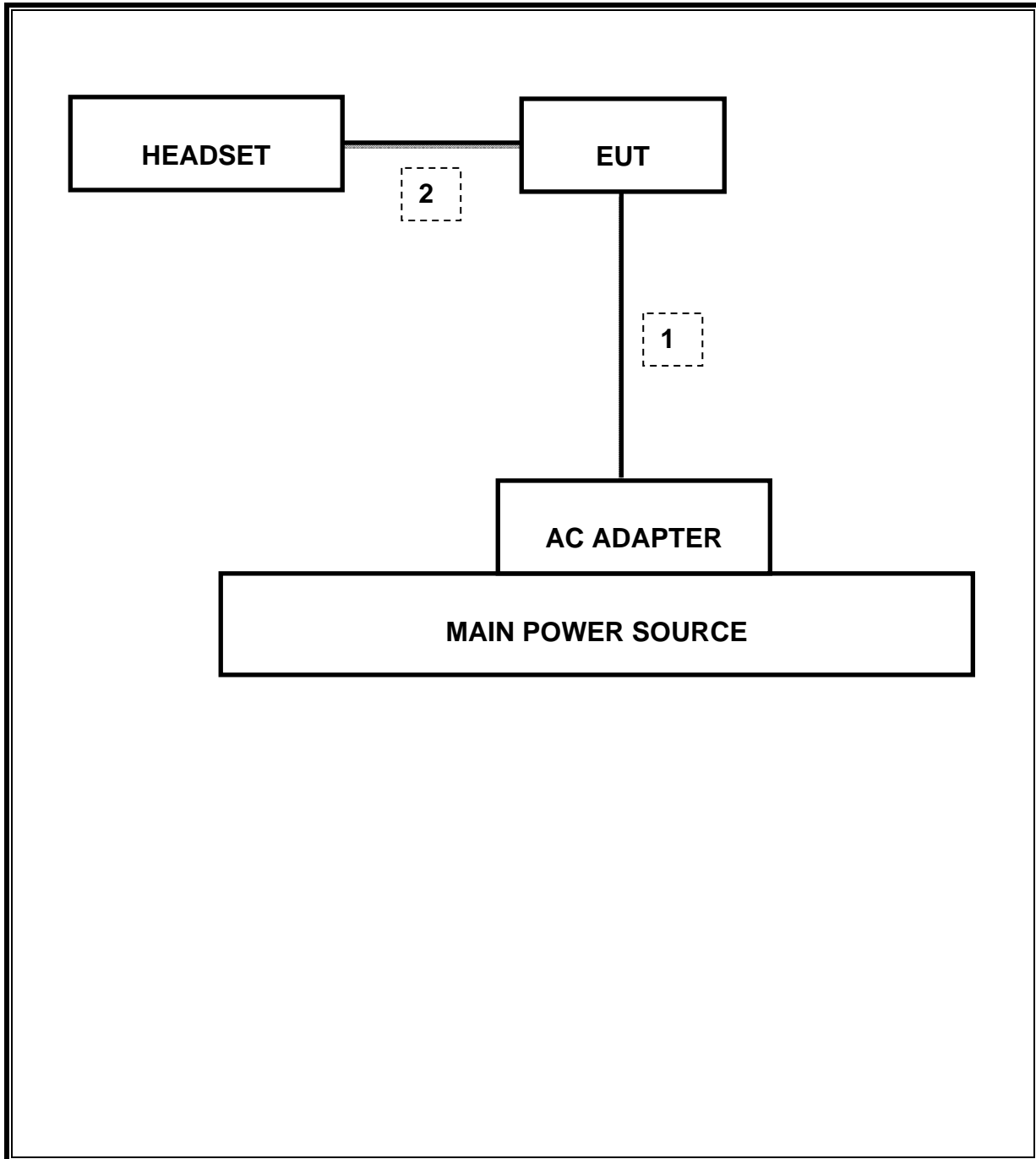
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests. EUT was set in the Hidden menu mode to enable BT communications.

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	C01171	03/23/13	02/13/14
Antenna, Horn, 18GHz	EMCO	3117	C01006	10/25/13	02/19/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/13	01/28/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/13	12/20/14
CBT Bluetooth Tester	R & S	CBT	None	07/12/13	07/12/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/13	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/13	12/13/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14	01/14/15
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR

7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	RSS-GEN 4.6	Occupied Band width (99%)	N/A	Conducted	Pass	See original
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	See original
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	See original
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	See original
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	See original
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	See original
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	See original
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	47.02dBuV/m

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. 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 1/T (on time) for average measurement.

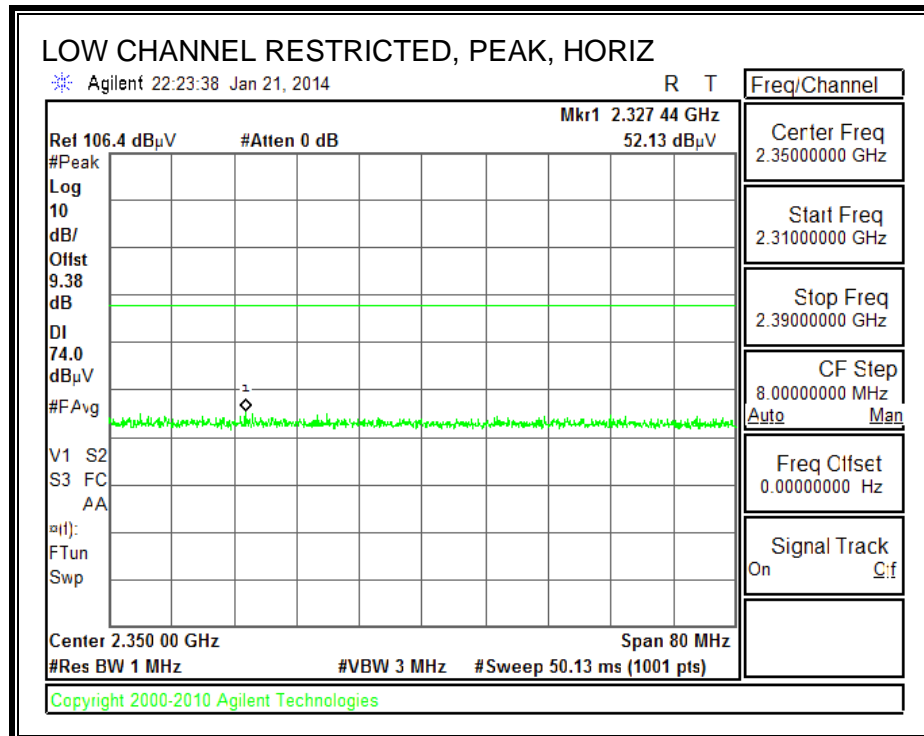
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

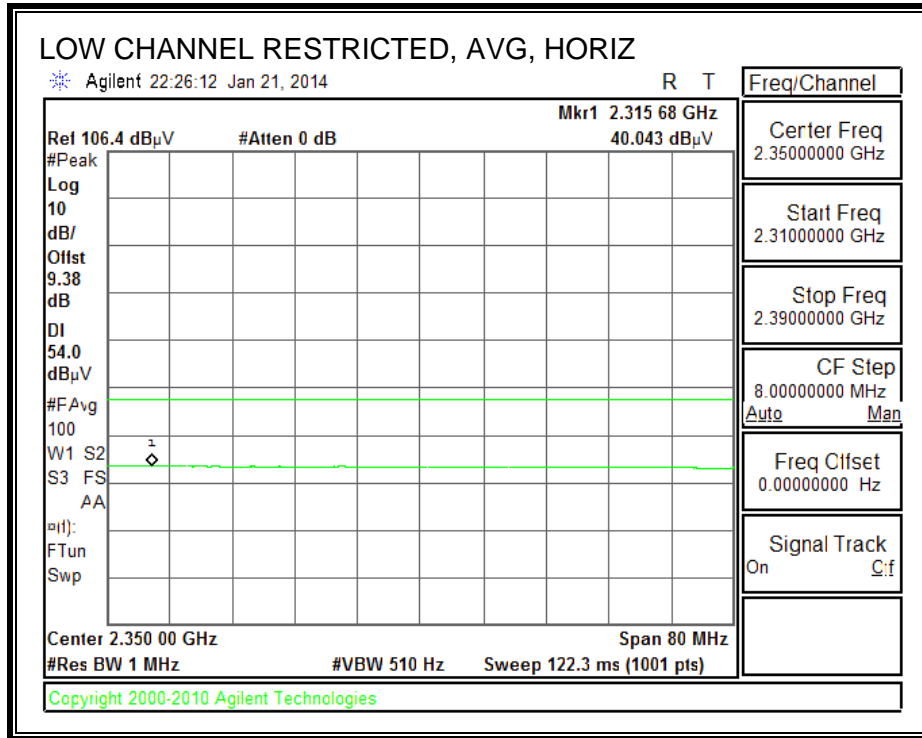
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

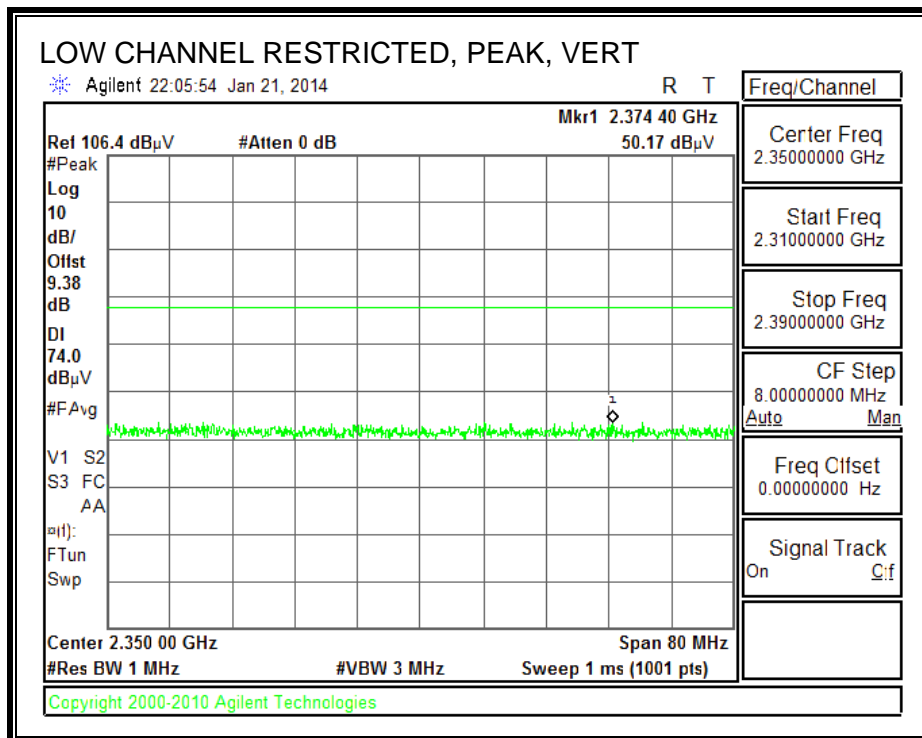
8.2.1. BASIC DATA RATE GFSK MODULATION

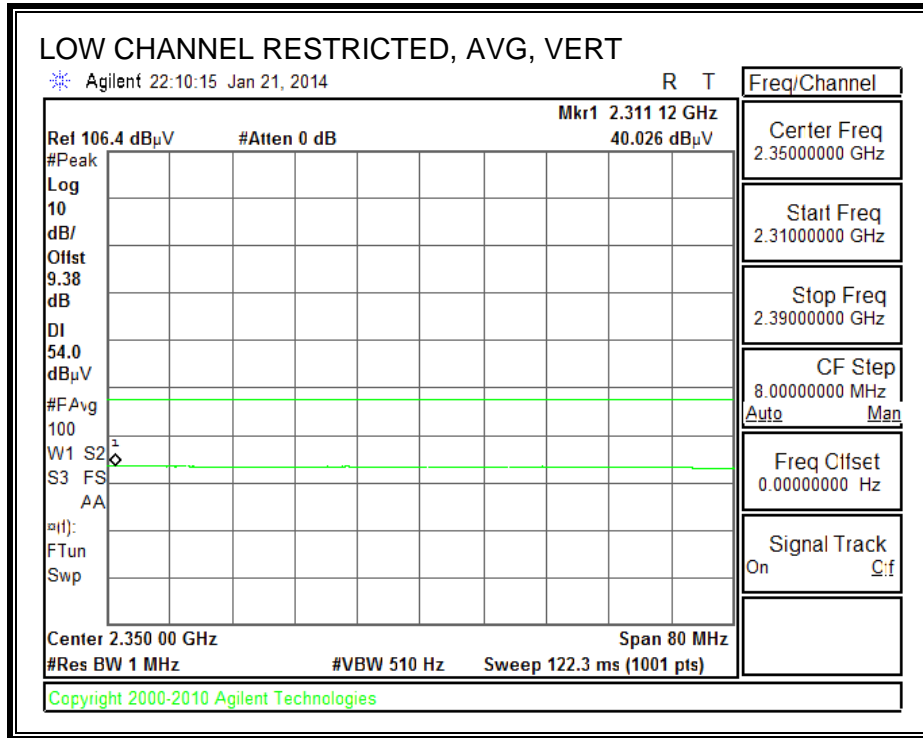
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



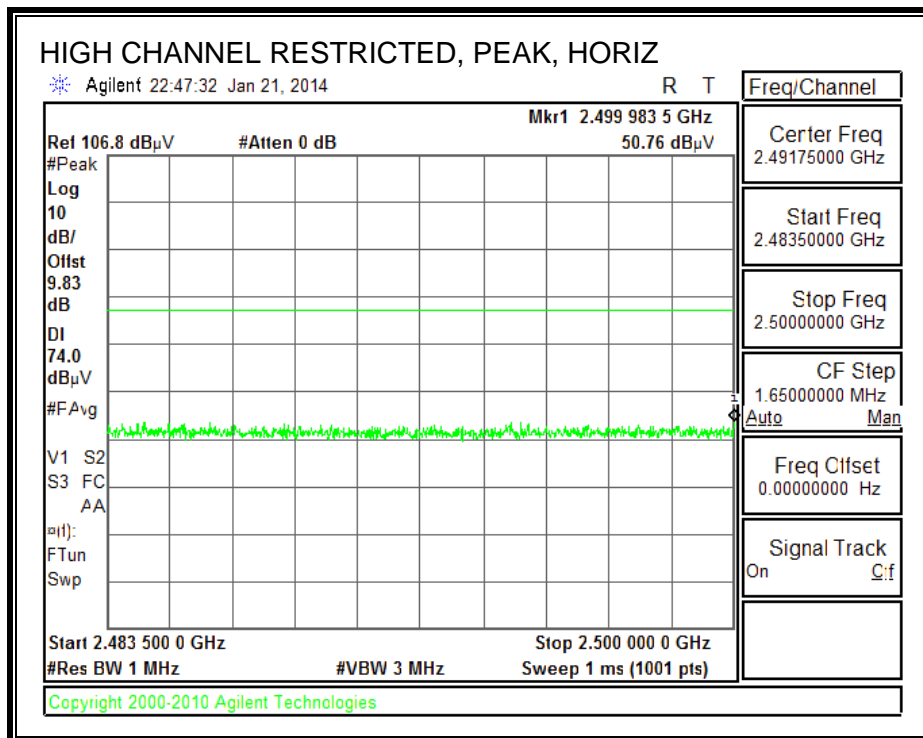


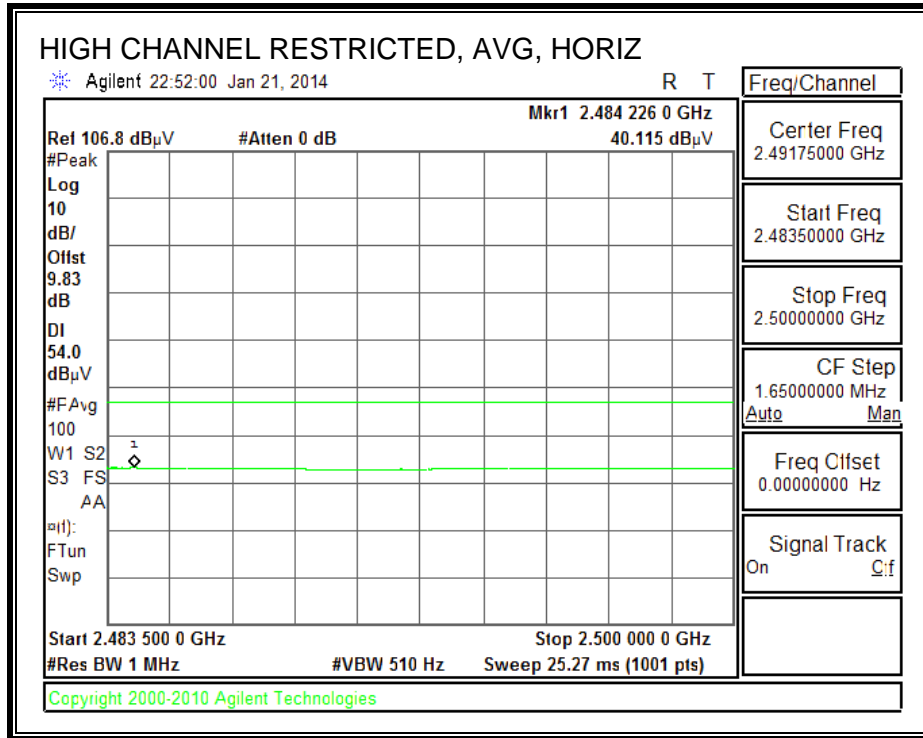
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



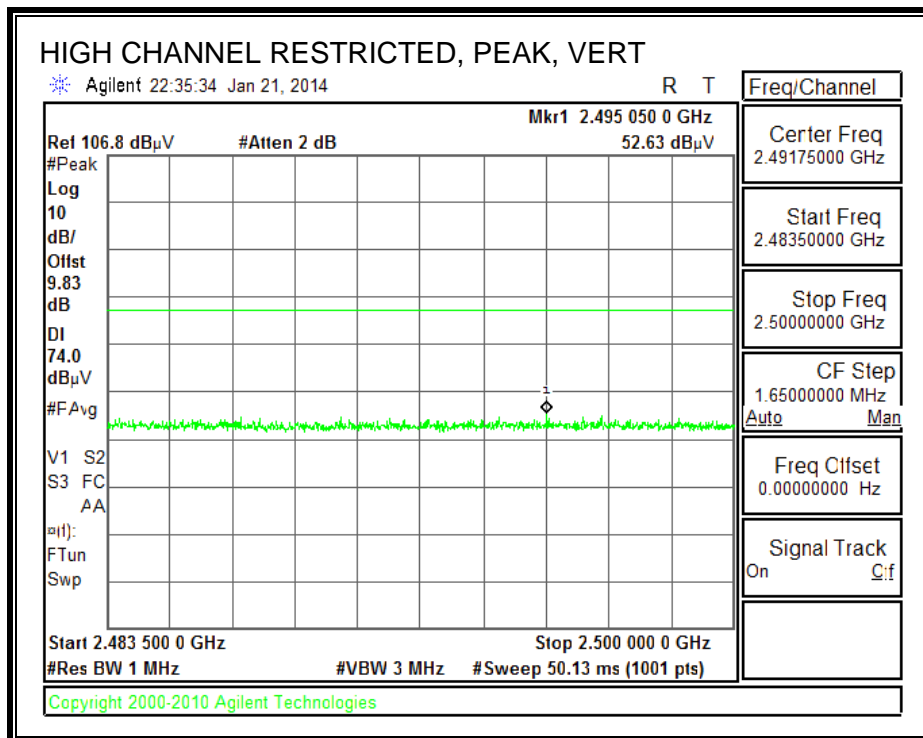


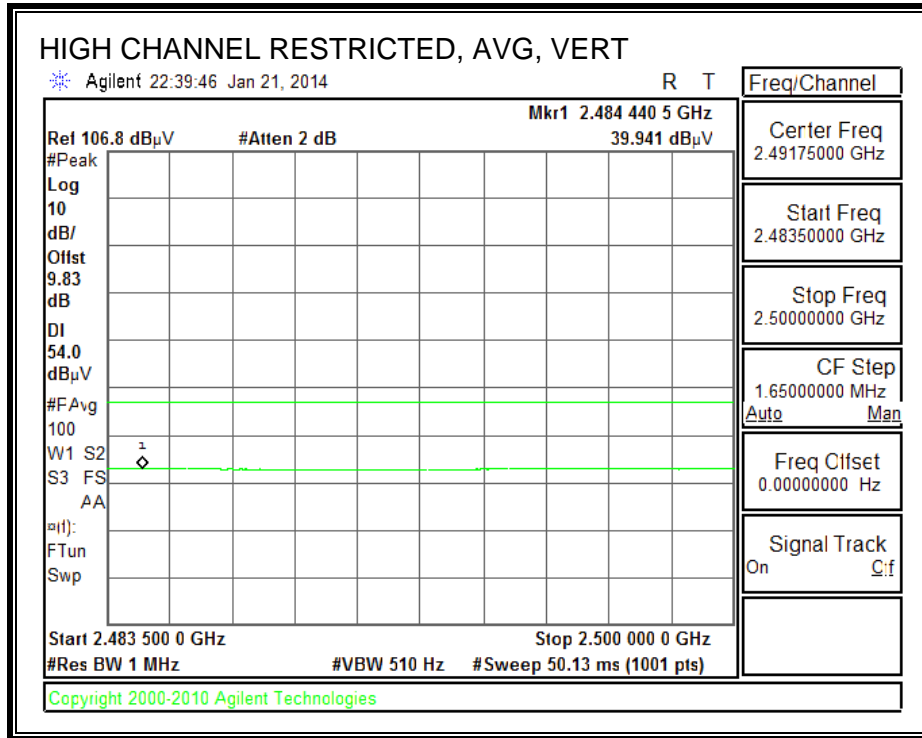
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





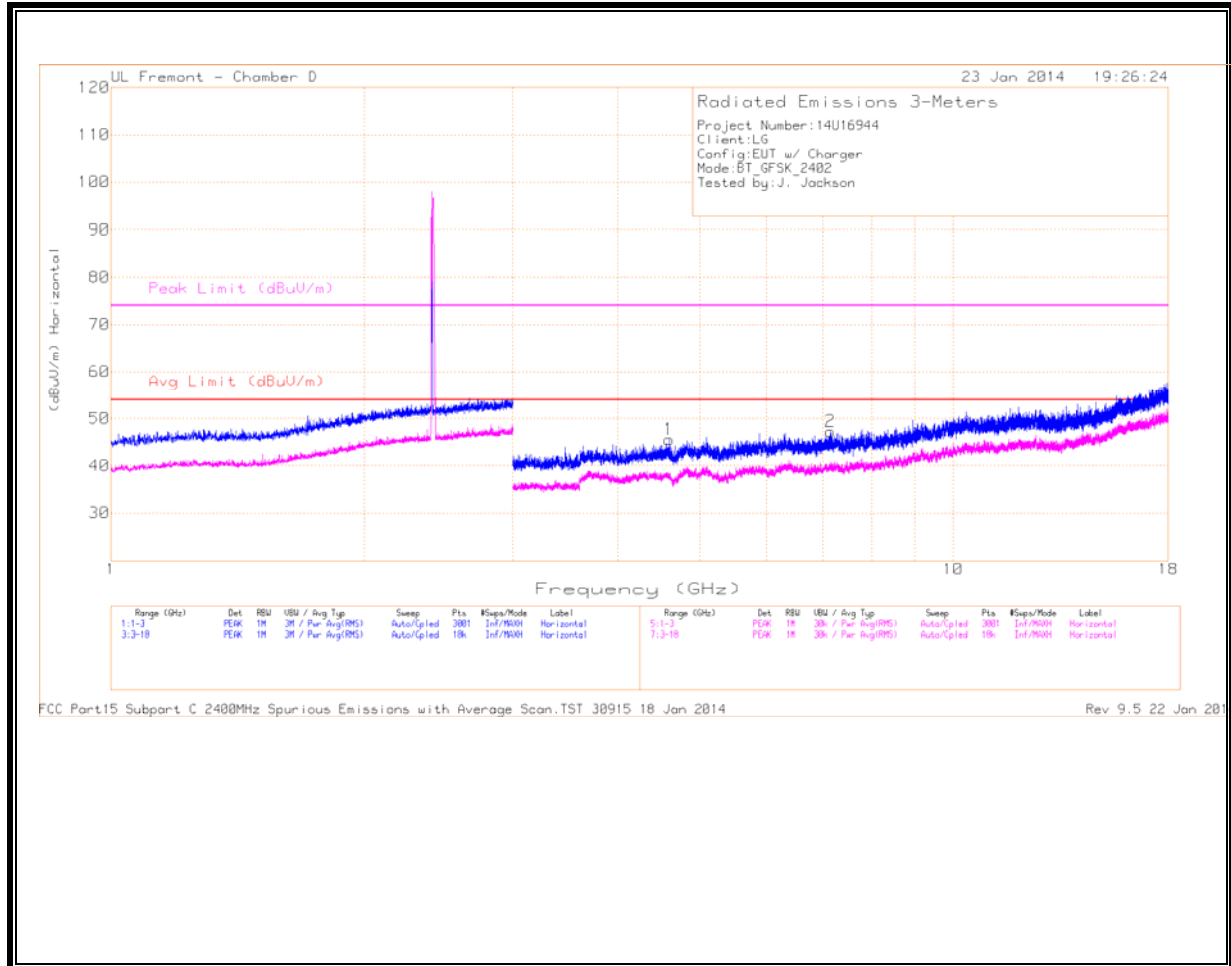
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





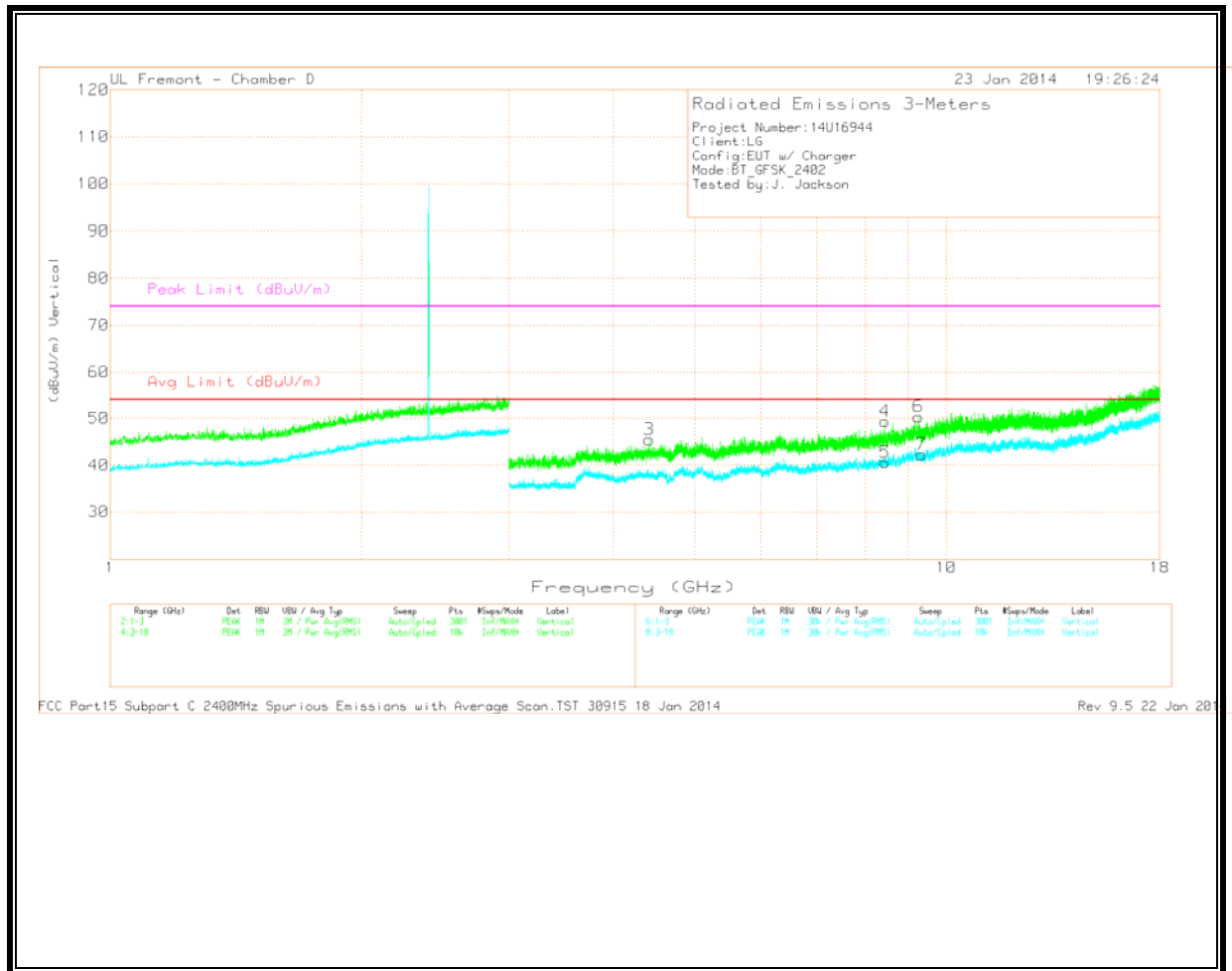
HARMONICS AND SPURIOUS EMISSIONS

**LOW CHANNEL
 HORIZONTAL**



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

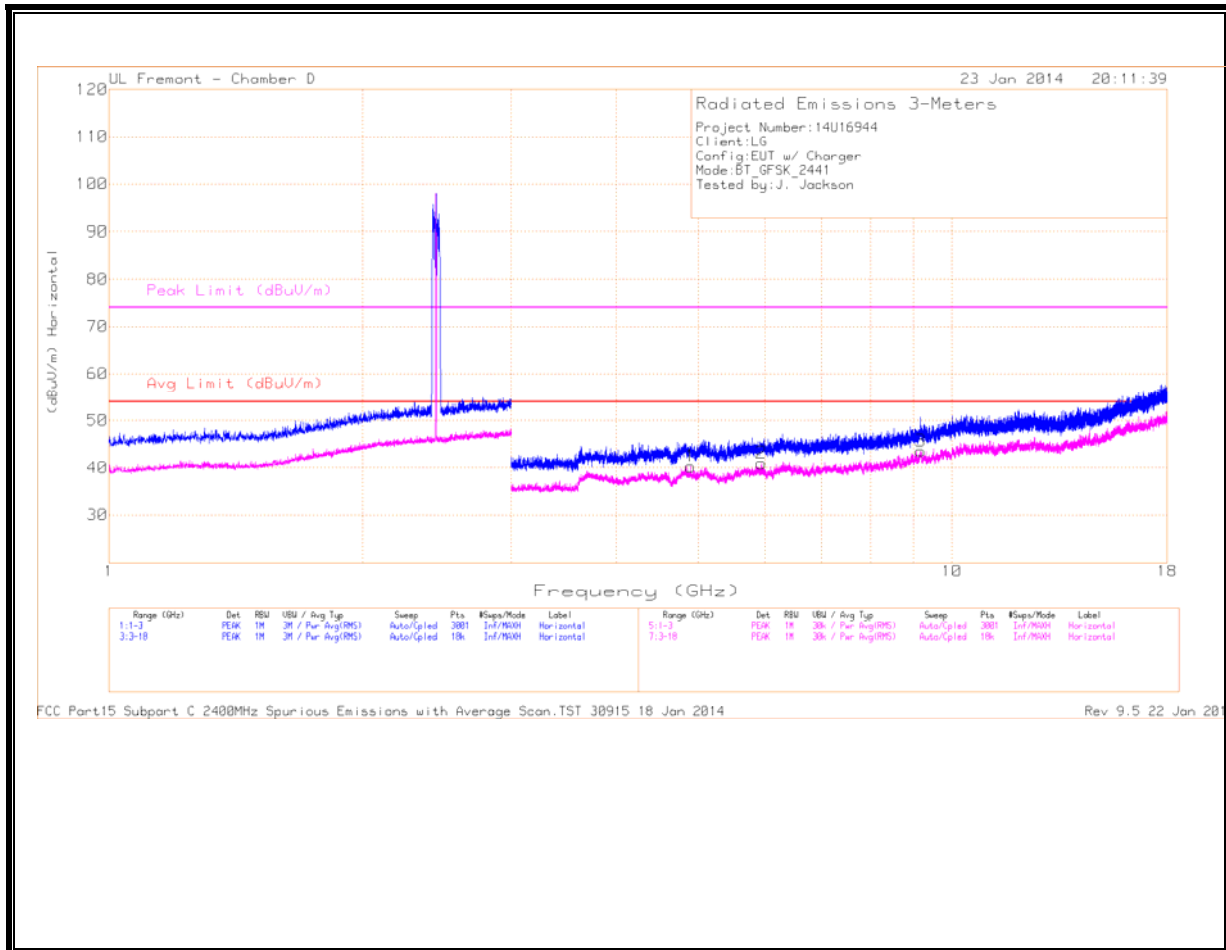
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Fitr/Pad (dB)	Correcte d Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	4.413	39.64	PK	34.1	-28.3	45.44	-	-	74	-28.56	0-360	201	V
1	4.599	37.99	PK	34.3	-26.8	45.49	-	-	74	-28.51	0-360	201	H
2	7.151	36.63	PK	35.9	-25.3	47.23	-	-	74	-26.77	0-360	100	H
4	8.448	36.94	PK	36.2	-23.8	49.34	-	-	74	-24.66	0-360	201	V
5	8.448	28.15	Avg	36.2	-23.8	40.55	53.97	-13.42	74	-33.45	0-360	201	V
6	9.26	35.13	PK	36.9	-21.7	50.33	-	-	74	-23.67	0-360	201	V
7	9.336	27.55	Avg	37	-22.3	42.25	53.97	-11.72	74	-31.75	0-360	201	V

PK - Peak detector

Avg - Video bandwidth < Resolution bandwidth

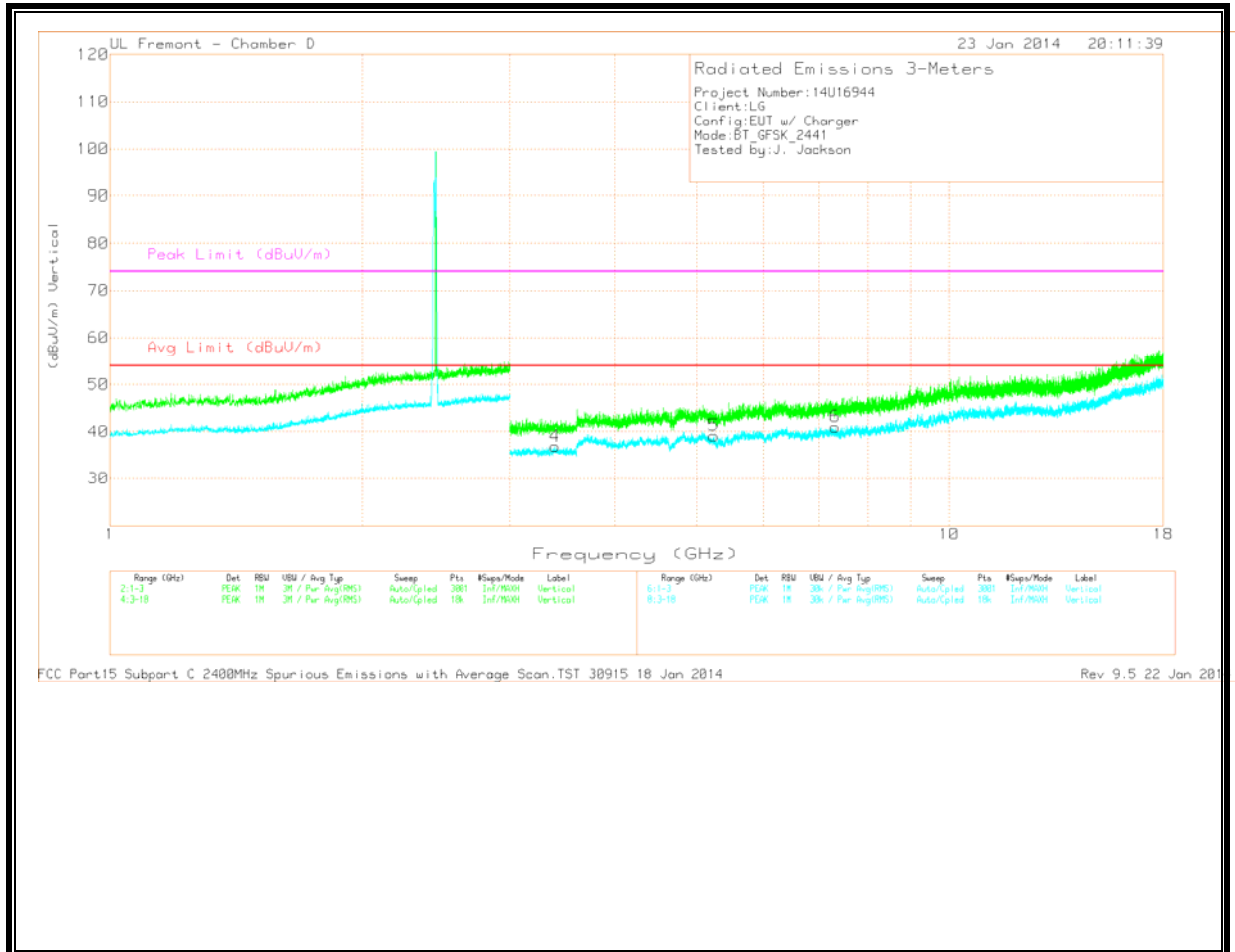
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan
 2014 Rev 9.5 22 Jan 2014

MID CHANNEL
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

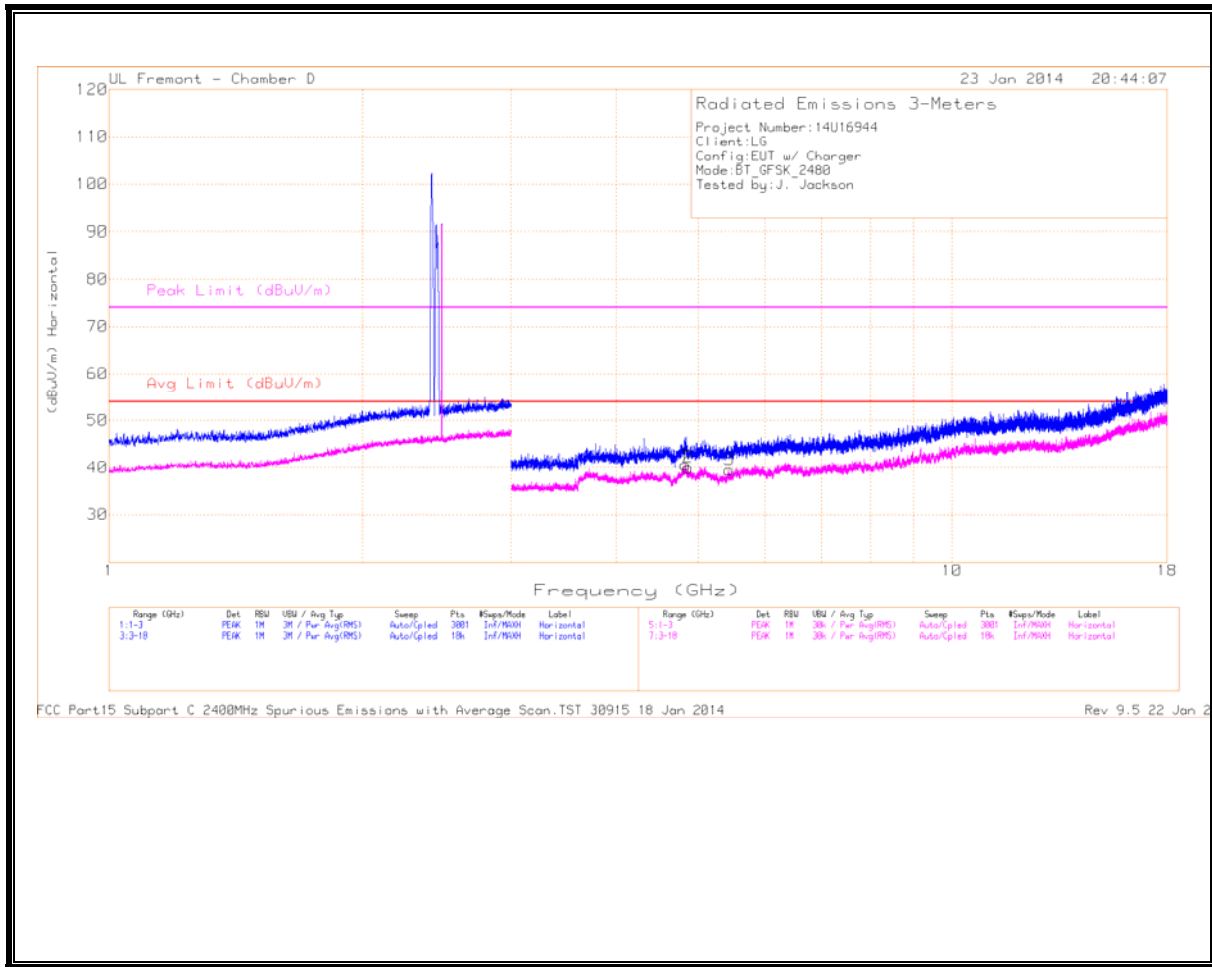
MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	3.395	31.55	Avg	33.3	-28	36.85	53.97	-17.12	74	-37.15	0-360	100	V
1	4.899	33.37	Avg	34.3	-27.4	40.27	53.97	-13.7	74	-33.73	0-360	201	H
5	5.241	31.96	Avg	34.7	-27.5	39.16	53.97	-14.81	74	-34.84	0-360	201	V
2	5.942	31.64	Avg	35.6	-26.3	40.94	53.97	-13.03	74	-33.06	0-360	201	H
6	7.321	30.13	Avg	35.9	-25	41.03	53.97	-12.94	74	-32.97	0-360	201	V
3	9.182	27.89	Avg	36.8	-21.2	43.49	53.97	-10.48	74	-30.51	0-360	100	H

Avg - Video bandwidth < Resolution bandwidth

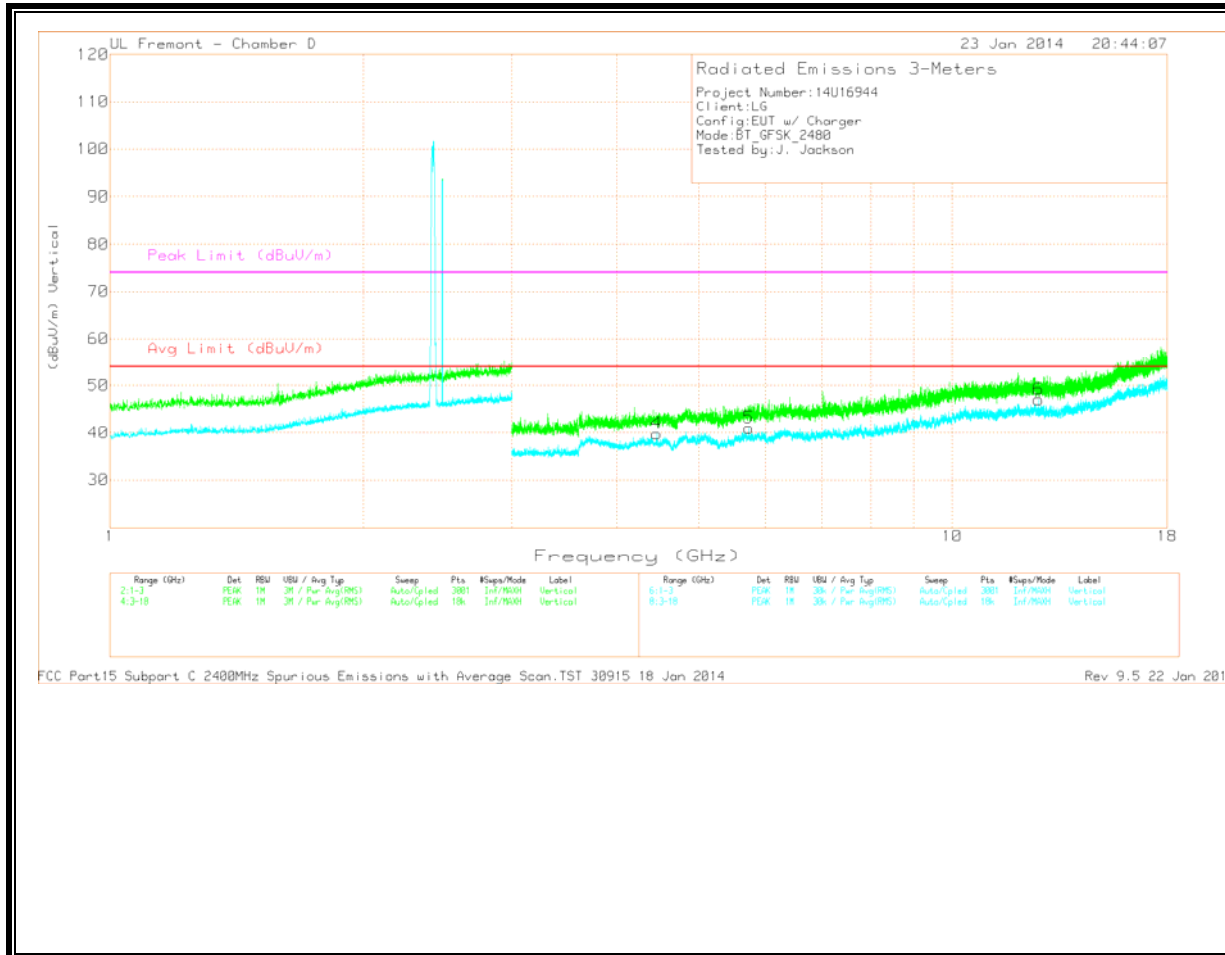
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL

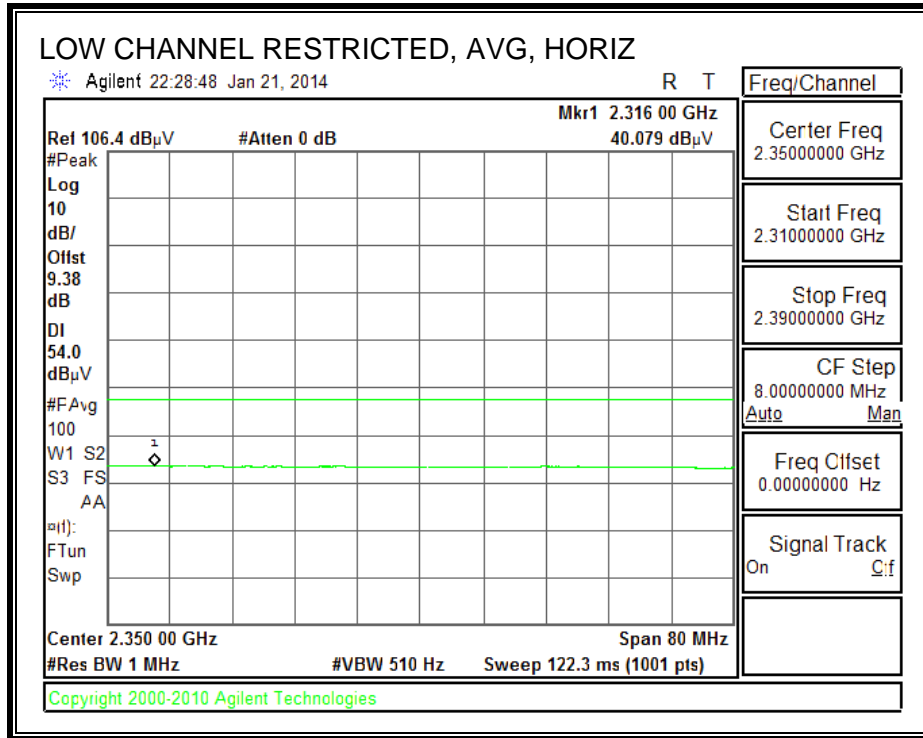


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

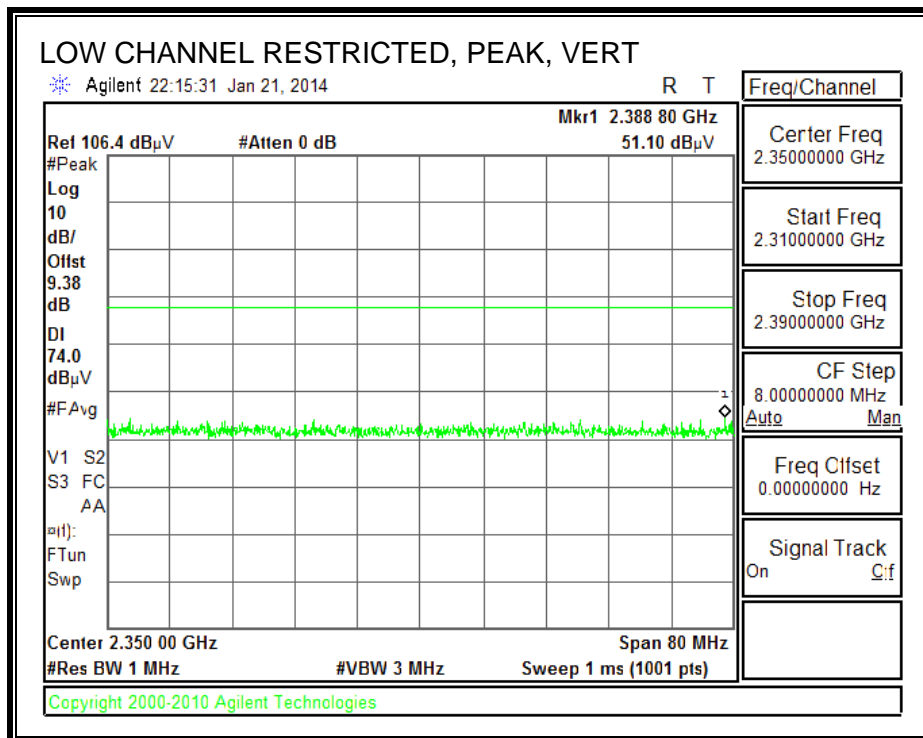
HIGH CHANNEL DATA

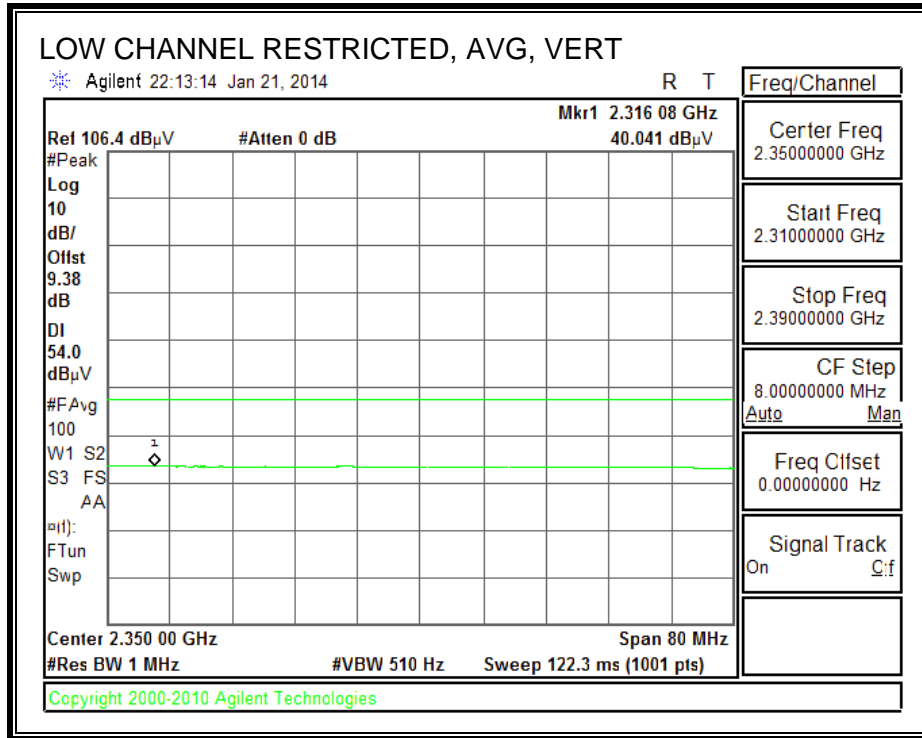
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	4.46	34.02	Avg	34.2	-28.4	39.82	53.97	-14.15	74	-34.18	0-360	100	V
1	4.827	32.9	Avg	34.4	-26.7	40.6	53.97	-13.37	74	-33.4	0-360	100	H
2	4.865	32.47	Avg	34.4	-26.9	39.97	53.97	-14	74	-34.03	0-360	201	H
3	5.443	31.91	Avg	34.8	-27.2	39.51	53.97	-14.46	74	-34.49	0-360	201	H
5	5.737	32.38	Avg	35.3	-26.7	40.98	53.97	-12.99	74	-33.02	0-360	201	V
6	12.661	29.72	Avg	39.2	-21.9	47.02	53.97	-6.95	74	-26.98	0-360	201	V

Avg - Video bandwidth < Resolution bandwidth
 FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

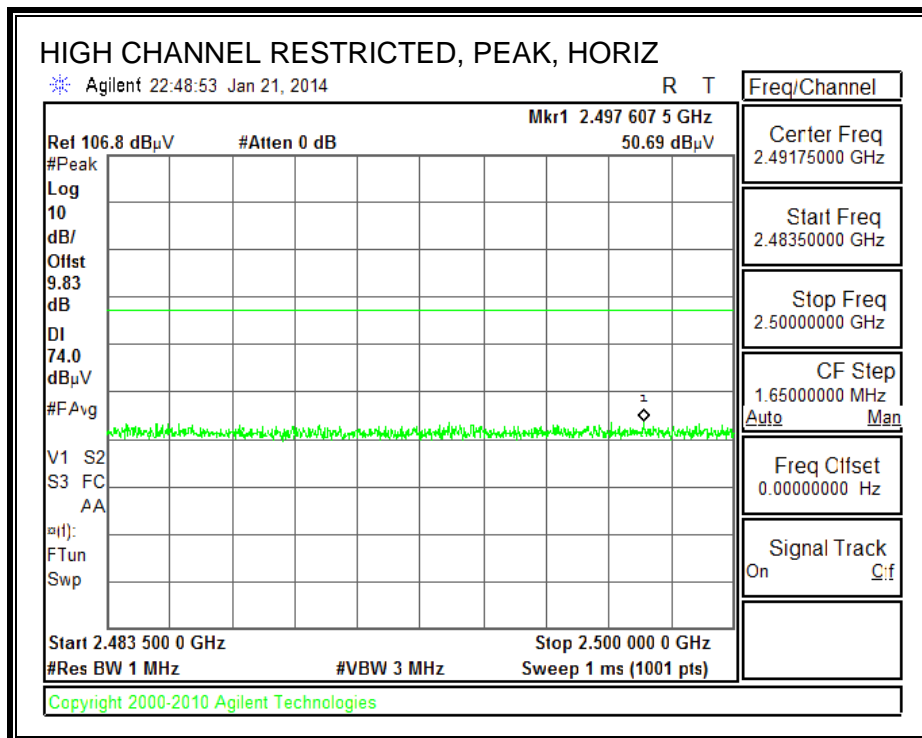


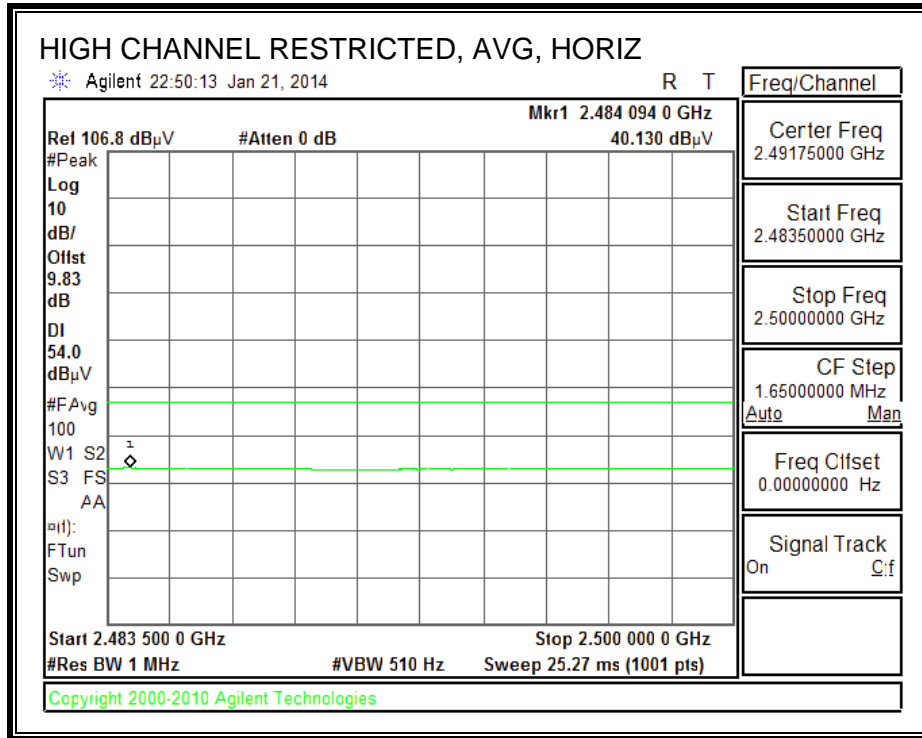
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



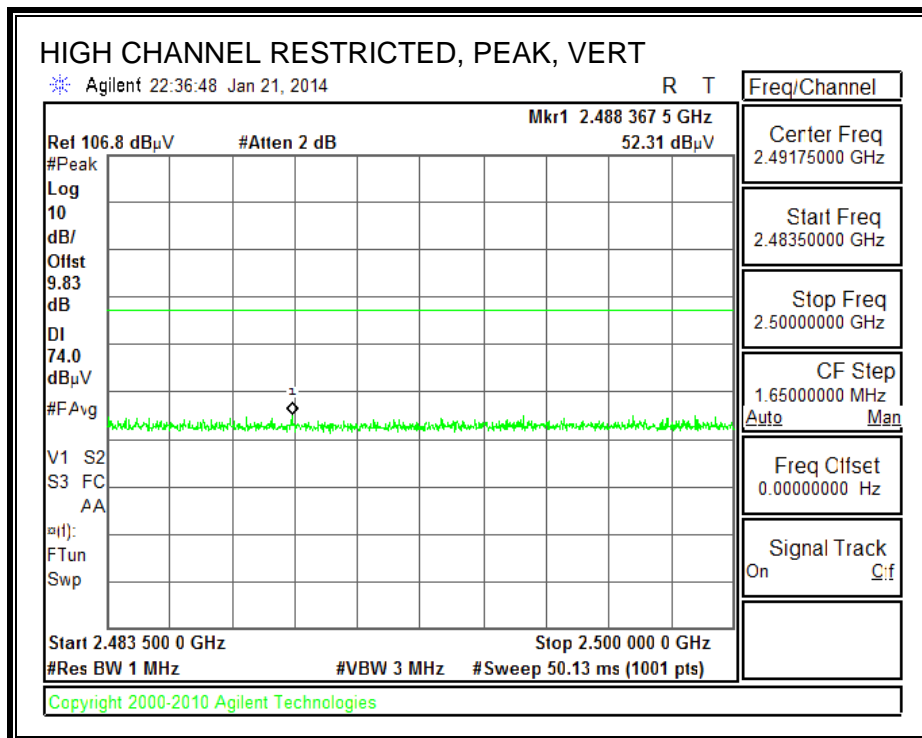


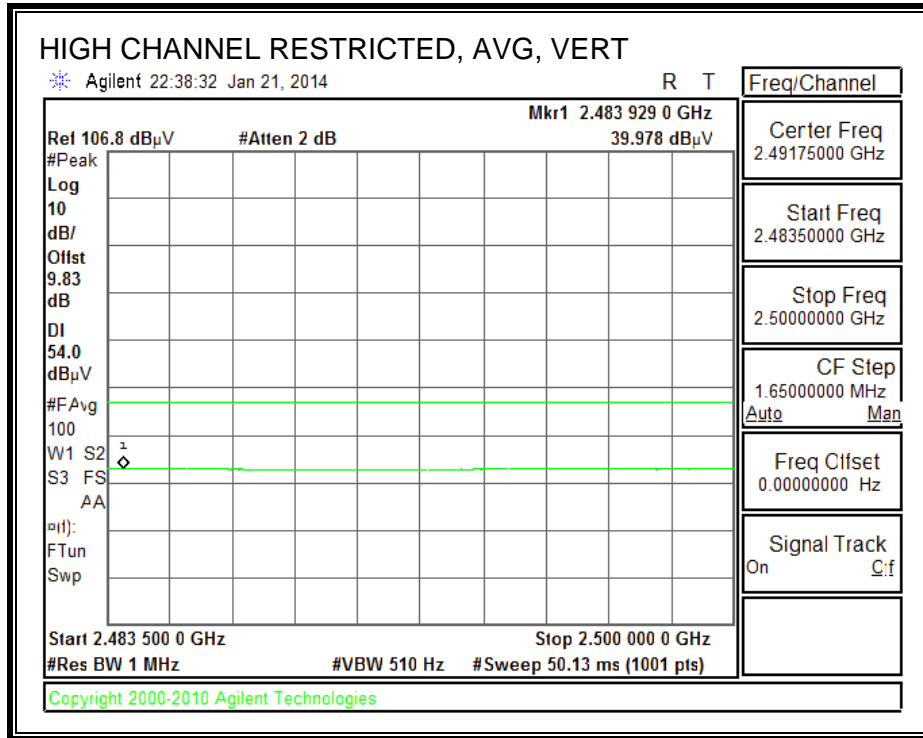
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





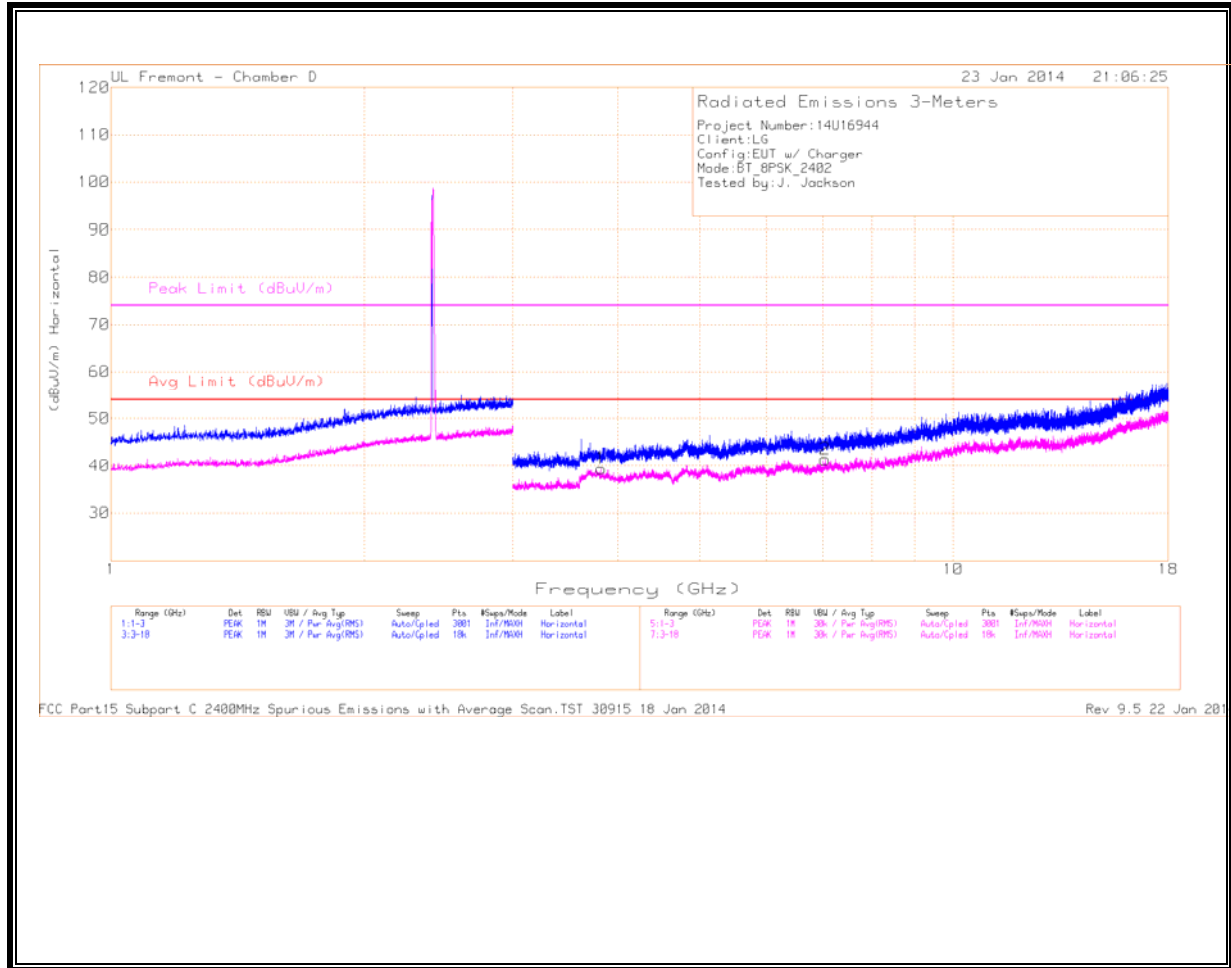
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





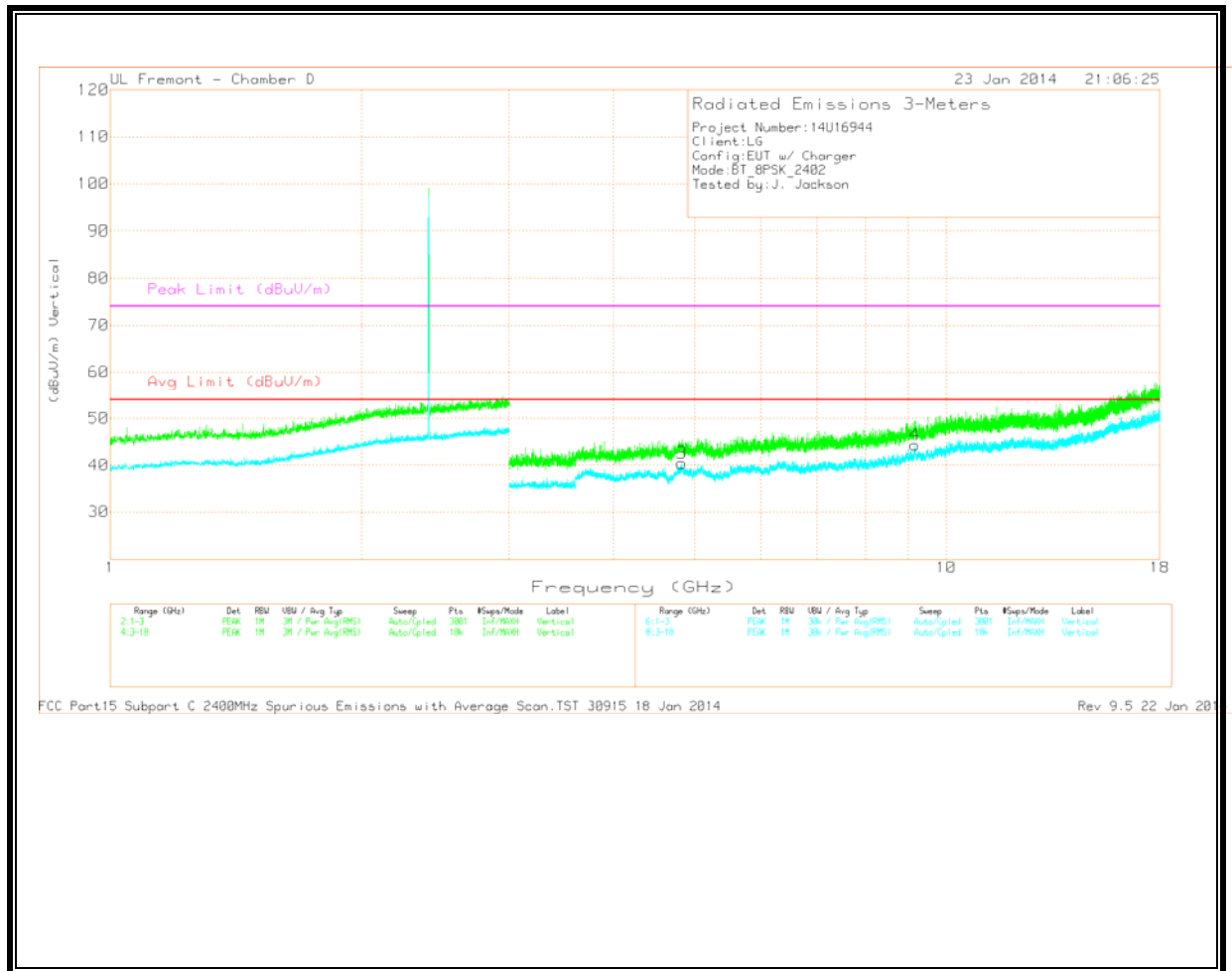
HARMONICS AND SPURIOUS EMISSIONS

**LOW CHANNEL
 HORIZONTAL**



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

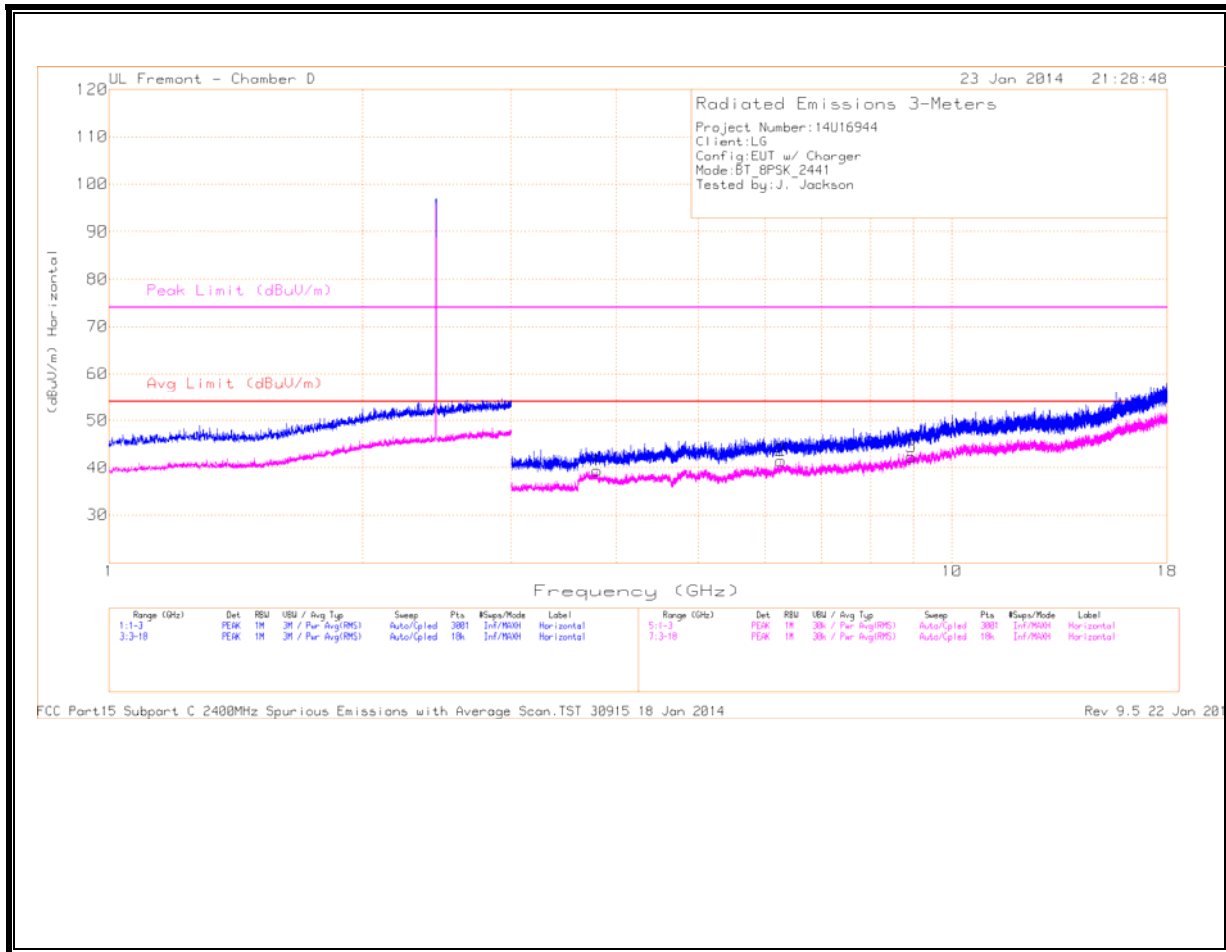
LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.818	34.37	Avg	33.8	-28.8	39.37	53.97	-14.6	74	-34.63	0-360	201	H
3	4.826	32.71	Avg	34.4	-26.7	40.41	53.97	-13.56	74	-33.59	0-360	100	V
2	7.044	30.92	Avg	35.9	-25.5	41.32	53.97	-12.65	74	-32.68	0-360	100	H
4	9.175	28.82	Avg	36.8	-21.3	44.32	53.97	-9.65	74	-29.68	0-360	201	V

Avg - Video bandwidth < Resolution bandwidth

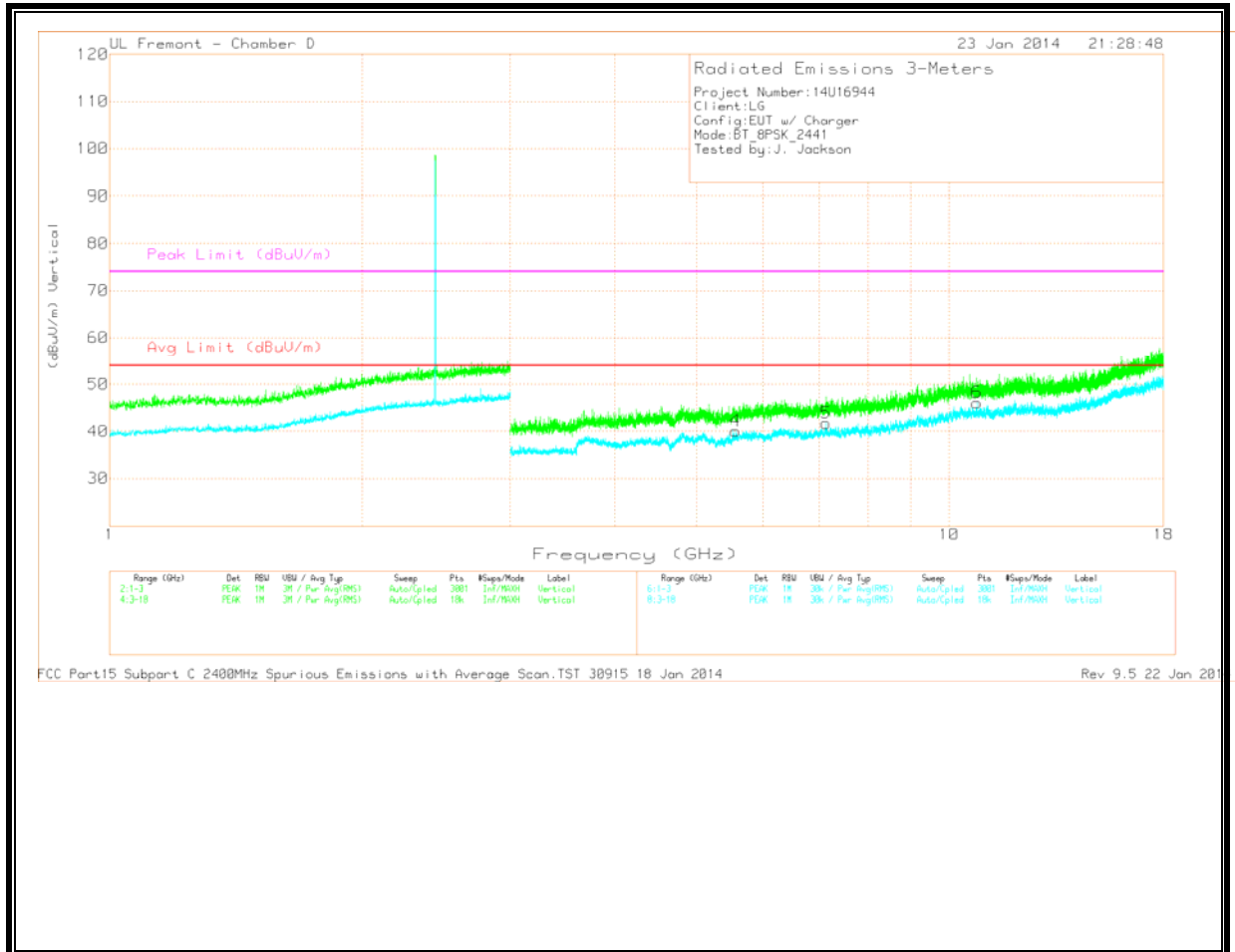
FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

MID CHANNEL
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



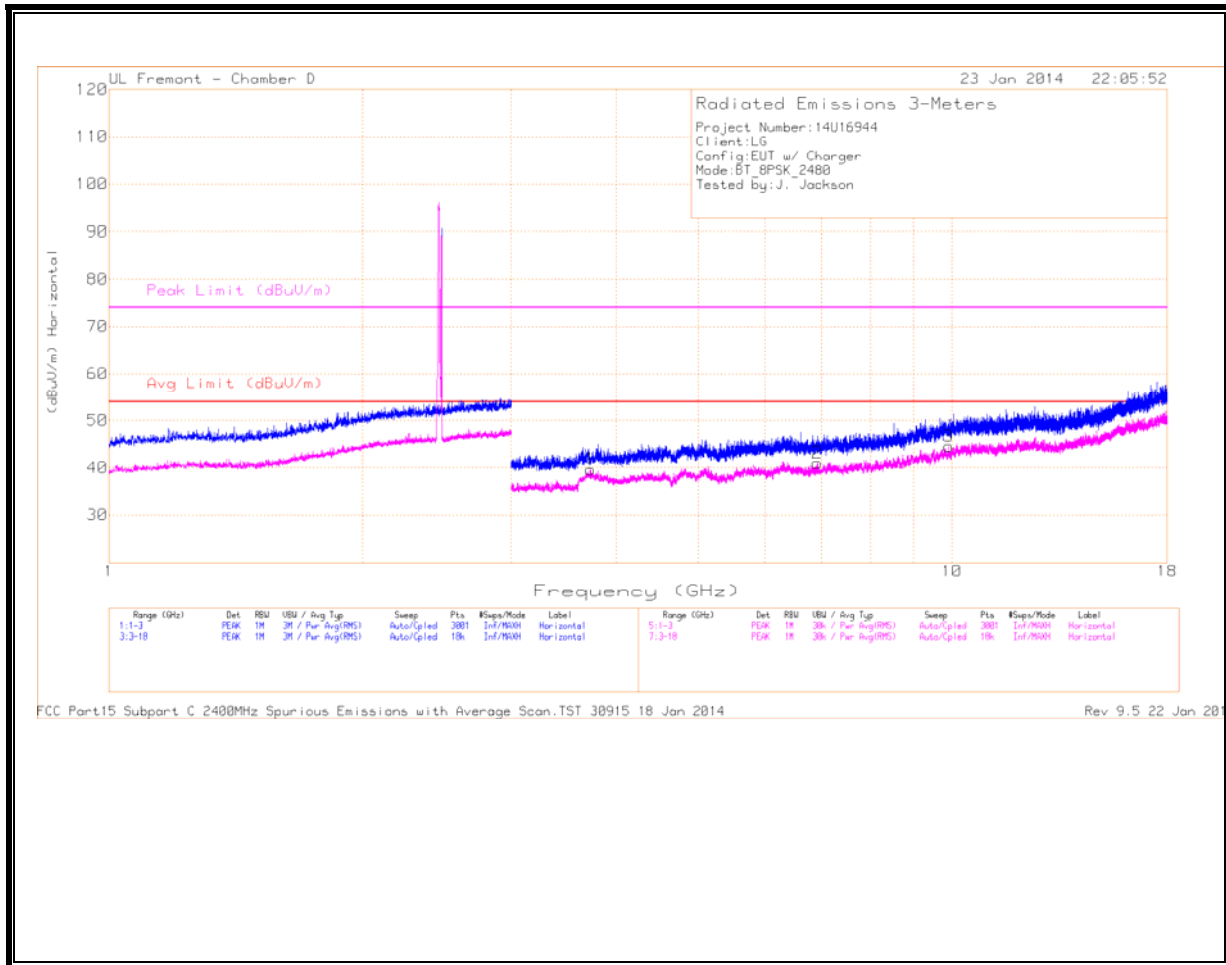
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.792	34.26	Avg	33.8	-28.7	39.36	53.97	-14.61	74	-34.64	0-360	201	H
4	5.567	32.56	Avg	34.9	-27.4	40.06	53.97	-13.91	74	-33.94	0-360	201	V
2	6.266	31.66	Avg	36	-26.2	41.46	53.97	-12.51	74	-32.54	0-360	201	H
5	7.137	31.11	Avg	35.9	-25.3	41.71	53.97	-12.26	74	-32.29	0-360	100	V
3	8.945	28.92	Avg	36.6	-23.2	42.32	53.97	-11.65	74	-31.68	0-360	201	H
6	10.79	28.96	Avg	38.5	-21.4	46.06	53.97	-7.91	74	-27.94	0-360	100	V

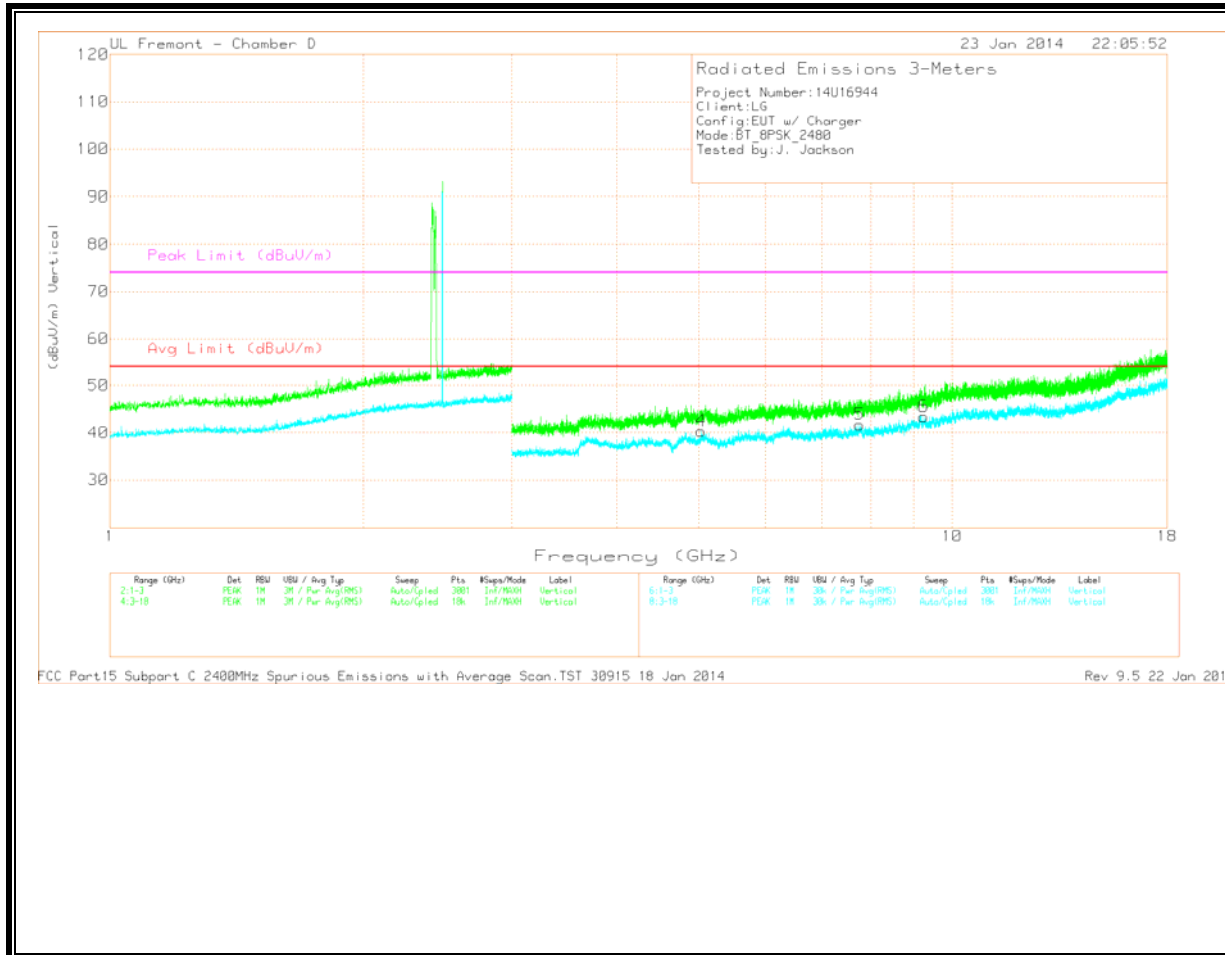
Avg - Video bandwidth < Resolution bandwidth
 FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

HIGH CHANNEL
 HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

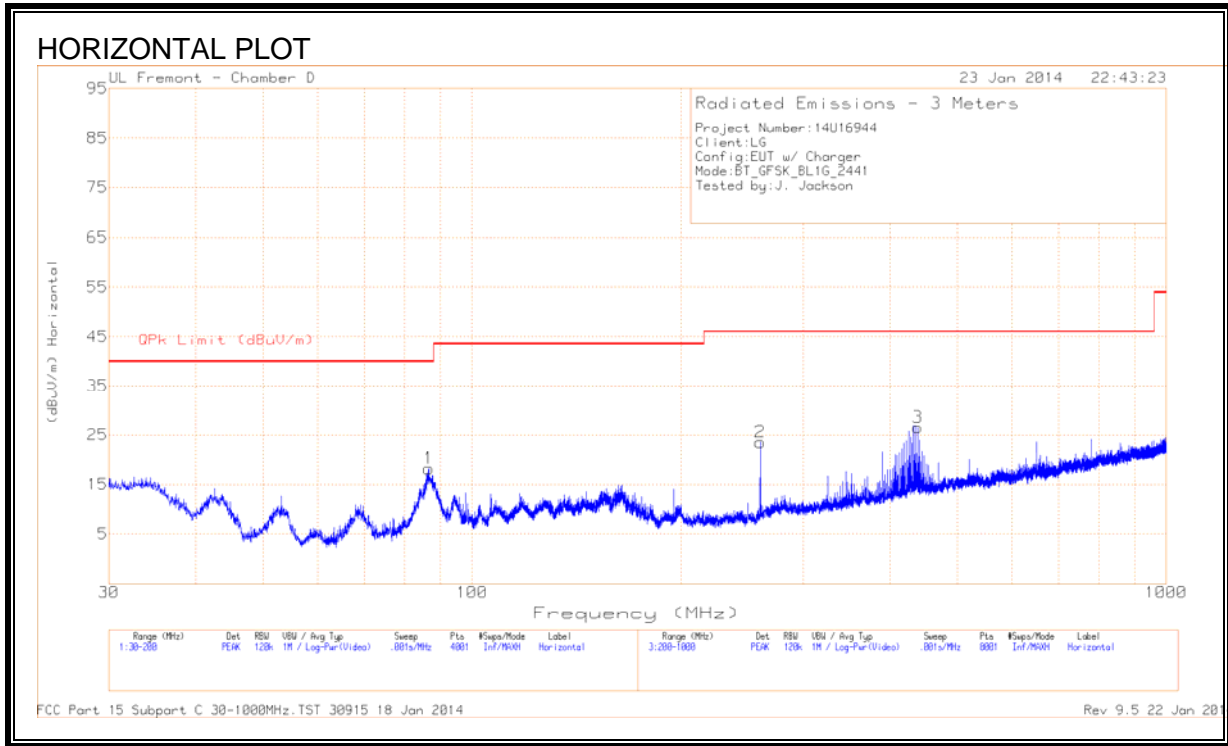
HIGH CHANNEL DATA

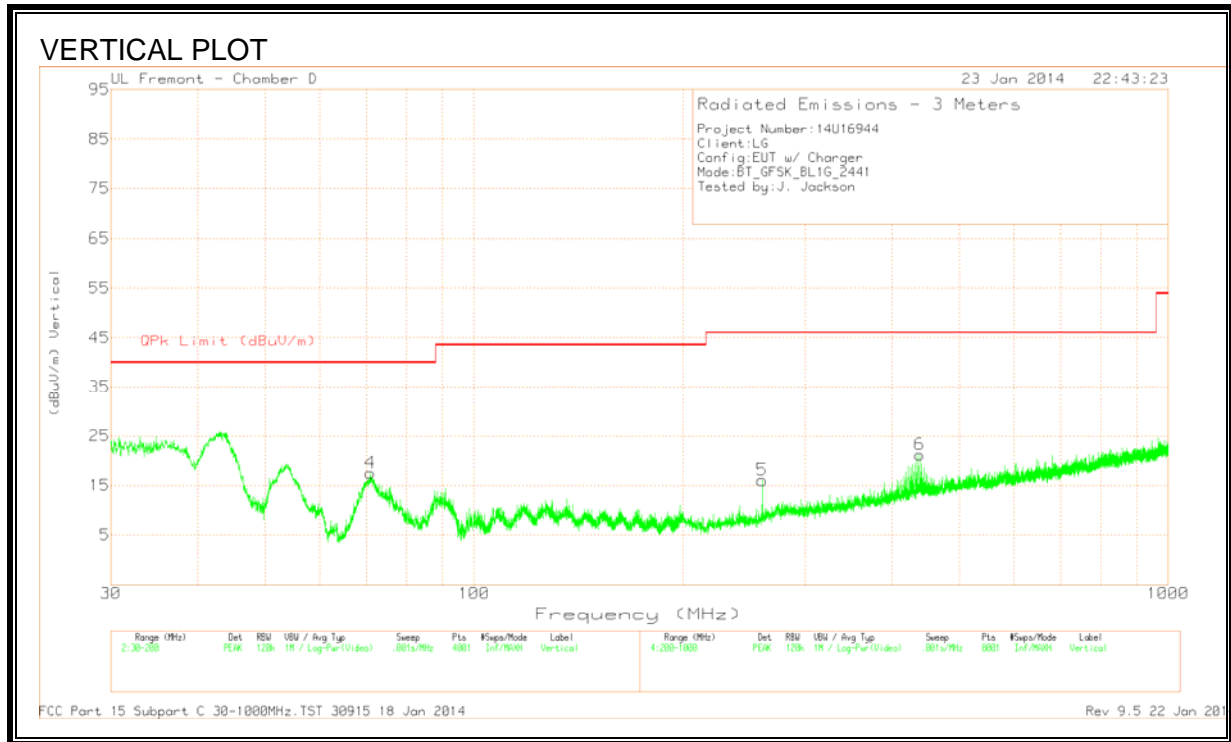
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (db/m)	Amp/Cbl/ Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.726	34.12	Avg	33.8	-28.3	39.62	53.97	-14.35	74	-34.38	0-360	100	H
4	5.036	33.01	Avg	34.4	-27.1	40.31	53.97	-13.66	74	-33.69	0-360	201	V
2	6.924	30.8	Avg	35.8	-25.6	41	53.97	-12.97	74	-33	0-360	100	H
5	7.763	29.87	Avg	36.1	-24.3	41.67	53.97	-12.3	74	-32.33	0-360	201	V
6	9.25	27.86	Avg	36.9	-21.4	43.36	53.97	-10.61	74	-30.64	0-360	201	V
3	9.915	28.39	Avg	37.7	-21.6	44.49	53.97	-9.48	74	-29.51	0-360	100	H

Avg - Video bandwidth < Resolution bandwidth
 FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 30915 18 Jan 2014 Rev 9.5 22 Jan 2014

8.3. WORST-CASE BELOW 1 GHz

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





Trace Markers

Marker	Frequenc y (MHz)	Meter Reading (dBuV)	Det	AF T407 dB/m	Amp/Cbl (dB)	Correcte d Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	70.9275	40.79	PK	8.3	-31.6	17.49	40	-22.51	0-360	100	V
1	86.6525	41.5	PK	7.7	-31	18.2	40	-21.8	0-360	200	H
2	260.2	42.11	PK	12.1	-30.7	23.51	46.02	-22.51	0-360	100	H
5	260.2	34.64	PK	12.1	-30.7	16.04	46.02	-29.98	0-360	200	V
3	438.4	39.5	PK	16.9	-29.9	26.5	46.02	-19.52	0-360	201	H
6	438.4	34.21	PK	16.9	-29.9	21.21	46.02	-24.81	0-360	100	V

PK - Peak detector

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