



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

**CERTIFICATION TEST REPORT**

**FOR**

**LTE PHONE BLUETOOTH, WLAN (2.4GHZ & 5GHZ) AND NFC**

**MODEL NUMBER: LG-D500, LGD500, D500, LGMS500, LG-MS500, MS500**

**FCC ID: ZNFD500**

**REPORT NUMBER: 13U14980-2**

**ISSUE DATE: MAY 16, 2013**

*Prepared for*  
**LG ELECTRONICS MOBILECOMM U.S.A., INC.  
1000 SYLVAN AVE.  
ENGLEWOODS CLIFFS, NJ 07632**

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



**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** LG ELECTRONICS MOBILECOMM U.S.A., INC.  
1000 SYLVAN AVE.  
ENGLEWOODS CLIFFS, NJ 07632

**EUT DESCRIPTION:** LTE Phone Bluetooth, WLAN(2.4GHz & 5GHz) and NFC

**MODEL:** LG-D500, LGD500, D500, LGMS500, LG-MS500, MS500

**SERIAL NUMBER:** 303KPHG337169

**DATE TESTED:** APRIL 22 ~ MAY 14, 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 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.

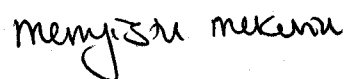
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of 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 Verification Services Inc. By:



PHILIP KIM  
WiSE PROGRAM MANAGER  
UL Verification Services Inc.

Tested By:



MENGISTU MEKURIA  
WiSE ENGINEER  
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, 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 LTE phone supports BLUETOOTH, WLAN (2.4GHZ & 5GHZ) 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	11.56	14.32
2402 - 2480	Enhanced 8PSK	10.96	12.47

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Planar Inverted F Antenna, with a maximum gain of 1.04 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 4.1.2  
The test utility software used during testing was D500\_LAP8930JR130328

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



## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WR	RB320071516	DoC
Earphone	Cresyn	EAB62410801	N/A	N/A

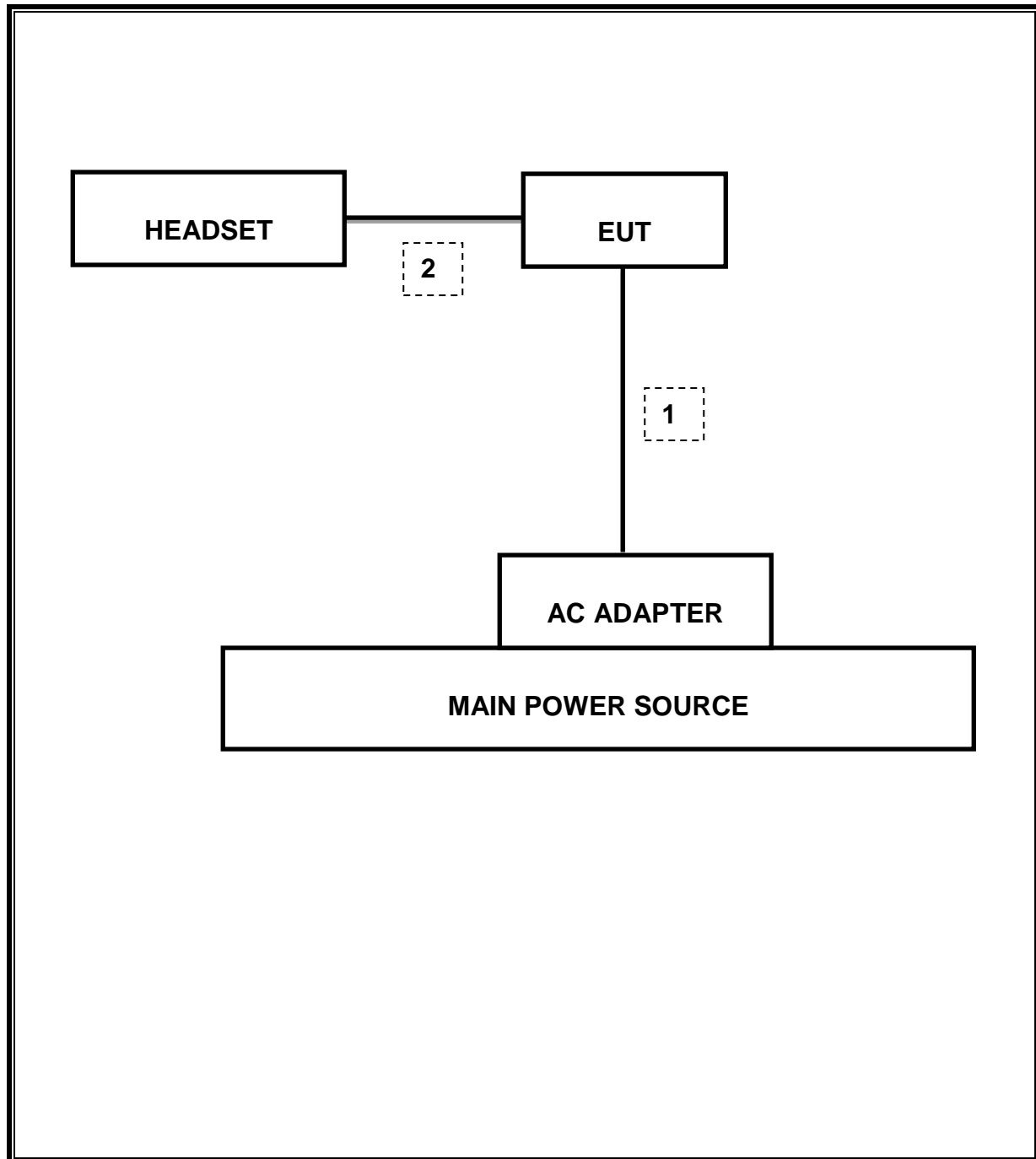
### I/O CABLES

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 Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/14
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/13
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/13
CBT Bluetooth Tester	R & S	CBT	None	05/15/13
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/13
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR

## 7. ANTENNA PORT TEST RESULTS

### 7.1. BASIC DATA RATE GFSK MODULATION

#### 7.1.1. 20 dB AND 99% BANDWIDTH

##### LIMIT

None; for reporting purposes only.

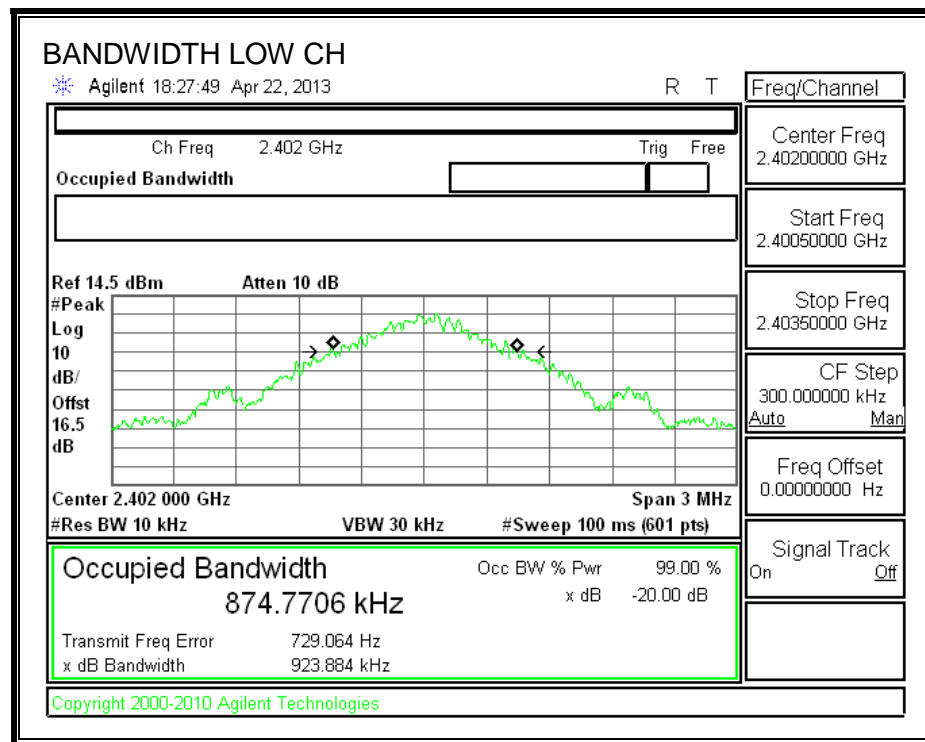
##### TEST PROCEDURE

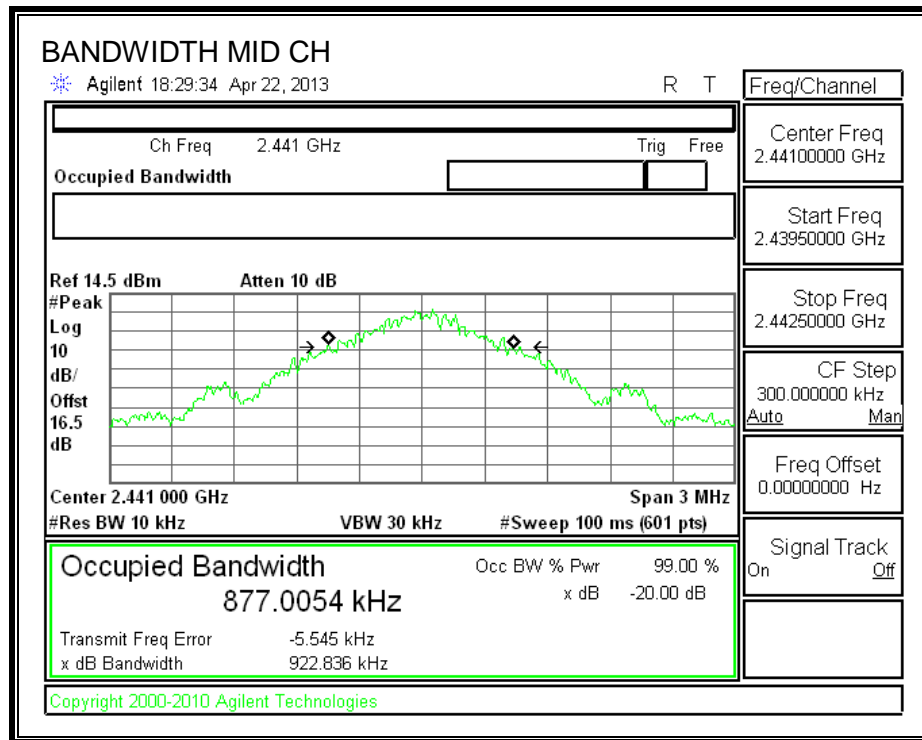
The transmitter output is connected to a spectrum analyzer. The RBW is set to  $\geq 1\%$  of the 20 dB bandwidth. The VBW is set to  $\geq$  RBW. The sweep time is coupled.

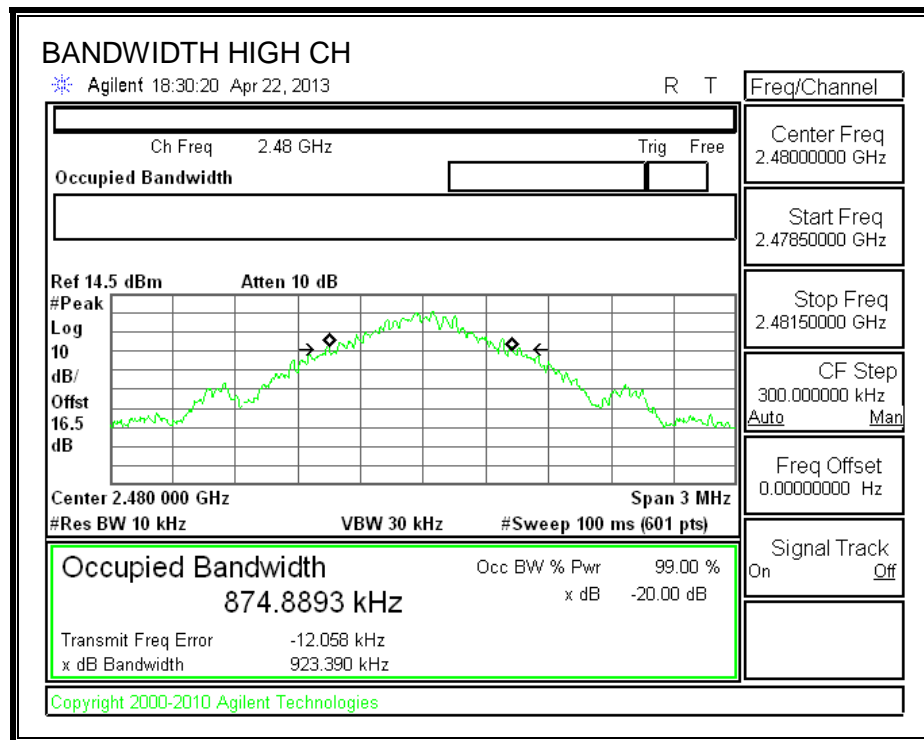
##### RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
Low	2402	923.884
Middle	2441	922.836
High	2480	923.39

**20 dB BANDWIDTH**







## **7.1.2. HOPPING FREQUENCY SEPARATION**

### **LIMIT**

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

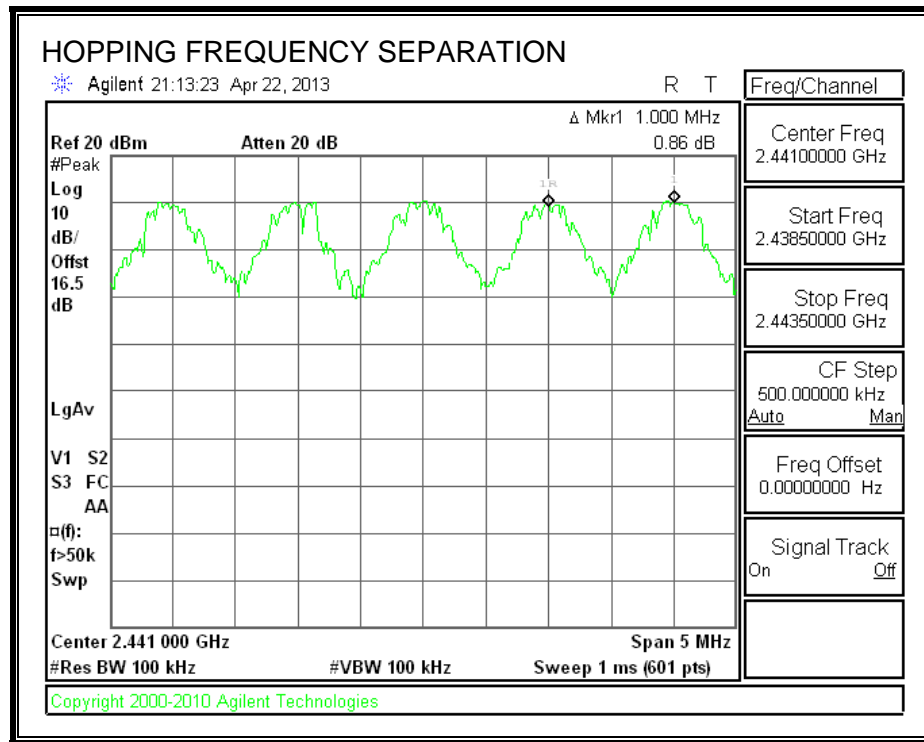
### **TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

### **RESULTS**



# HOPPING FREQUENCY SEPARATION



### **7.1.3. NUMBER OF HOPPING CHANNELS**

#### **LIMIT**

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

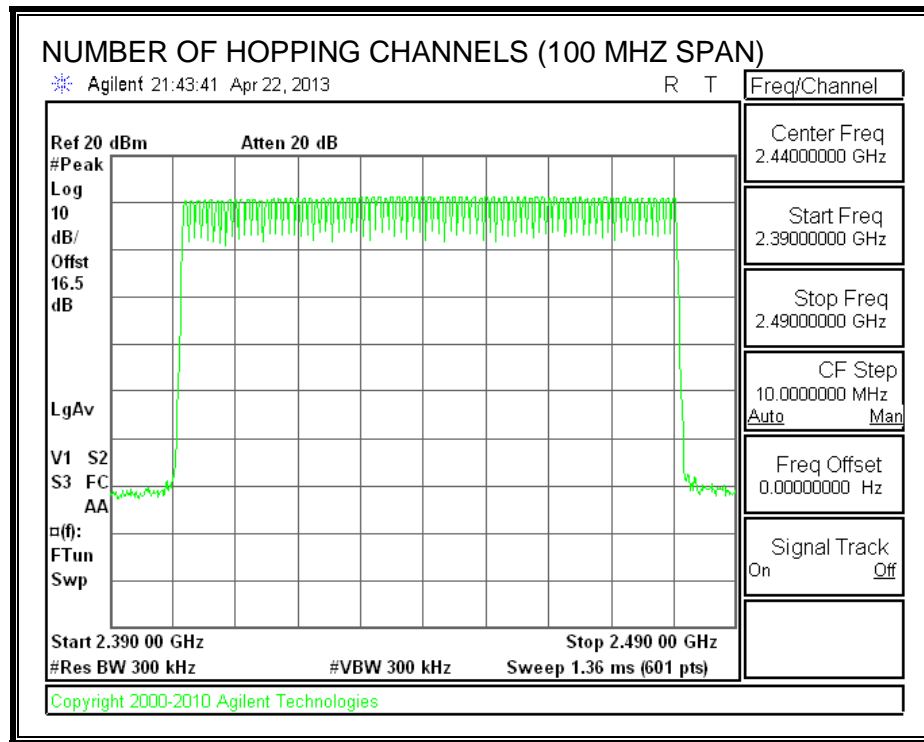
#### **TEST PROCEDURE**

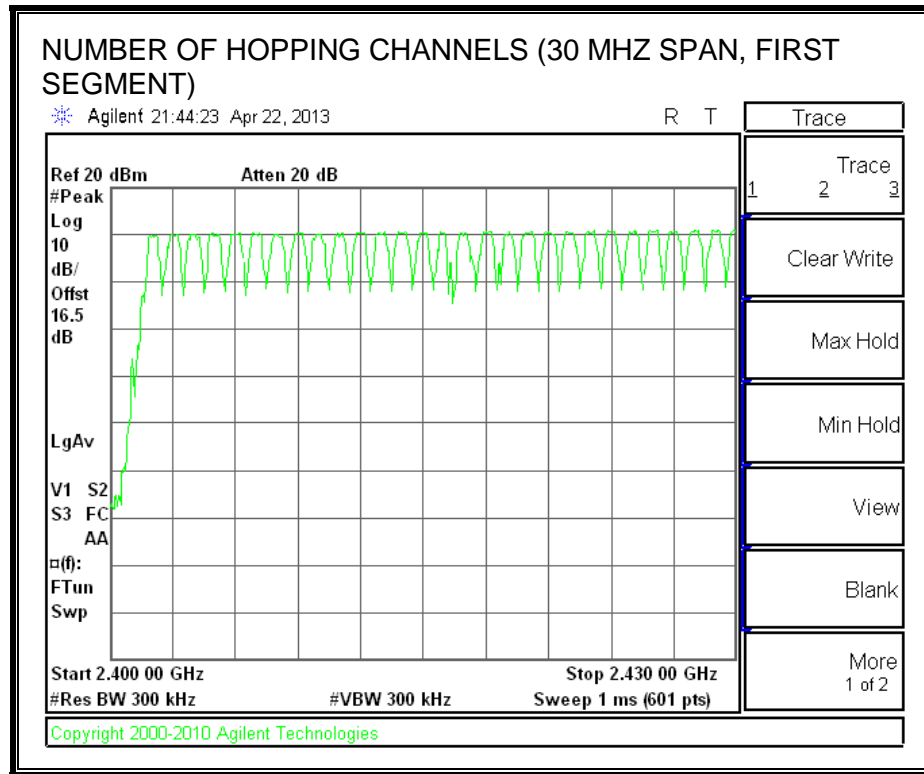
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

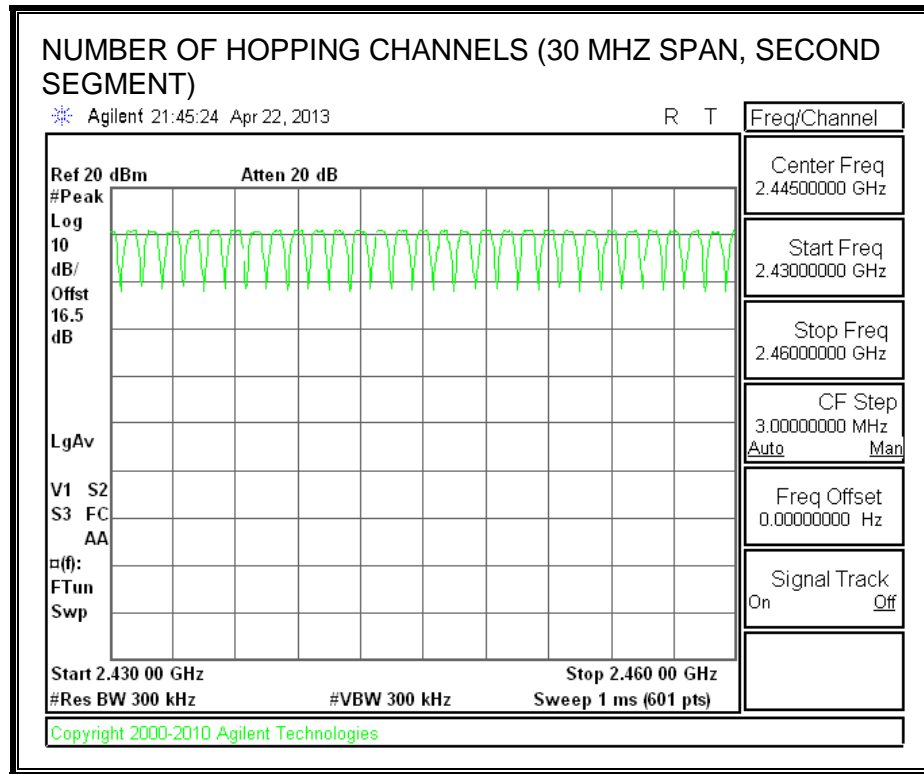
#### **RESULTS**

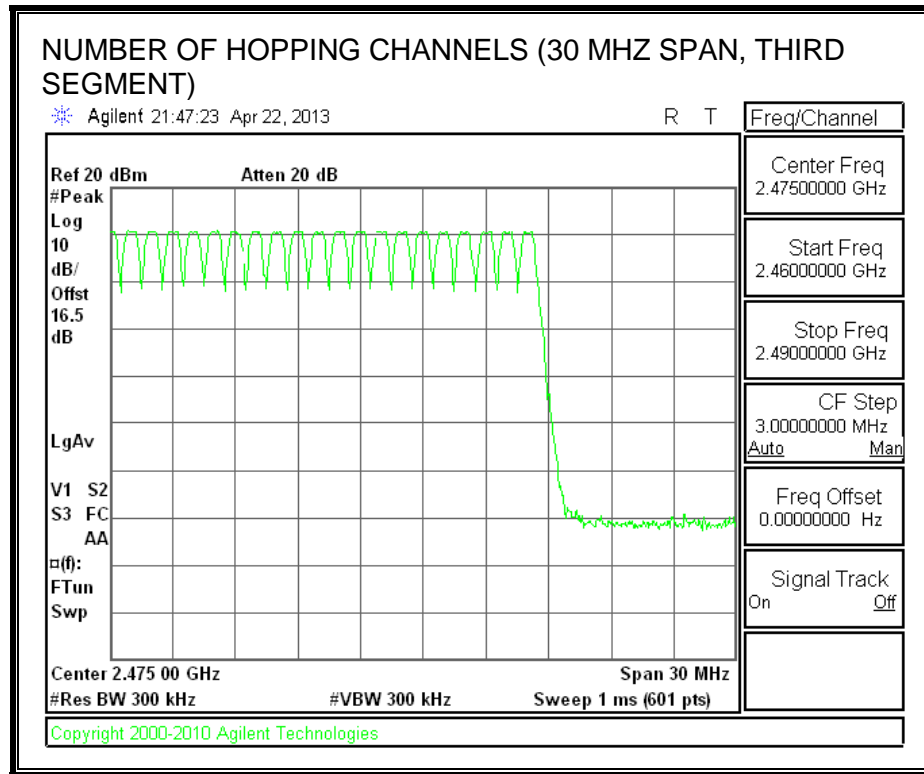
Normal Mode: 79 Channels observed.

# NUMBER OF HOPPING CHANNELS









#### 7.1.4. AVERAGE TIME OF OCCUPANCY

##### LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

##### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

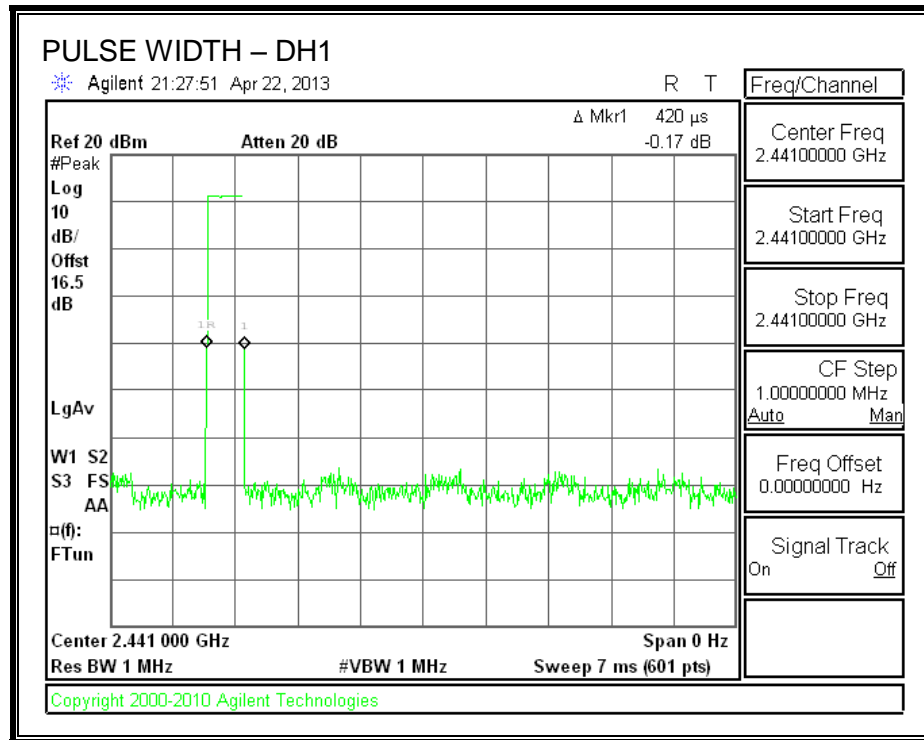
The average time of occupancy in the specified 31.6 second period (79 channels \* 0.4 s) is equal to  $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{pulse width}$ .

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels \* 0.4 seconds) is equal to  $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{pulse width}$ .

##### RESULTS

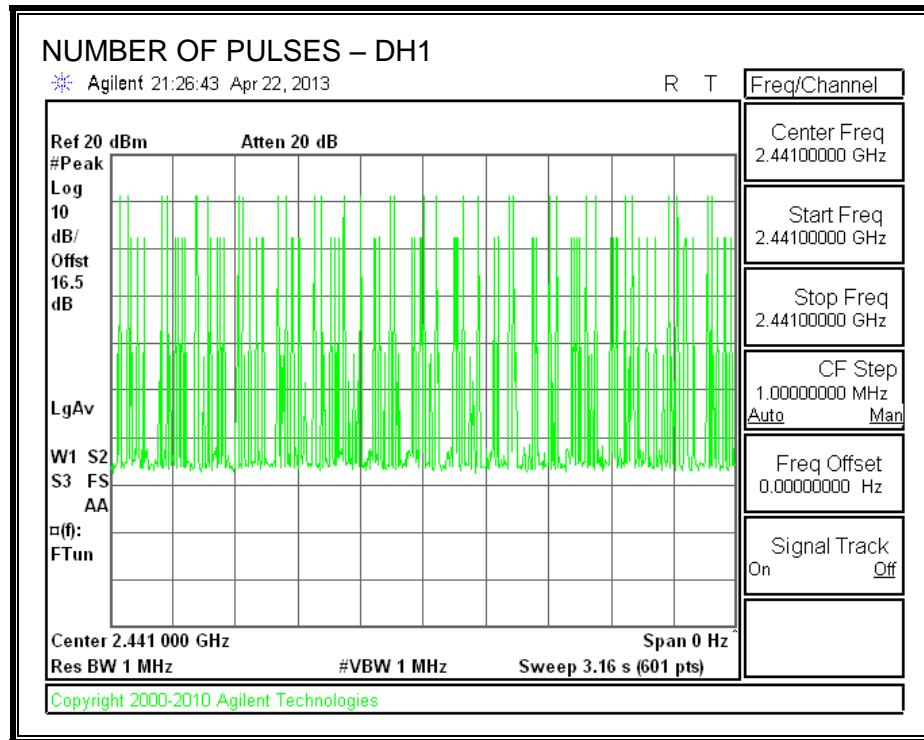
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.42	31	0.130	0.4	-0.270
DH3	1.668	13	0.217	0.4	-0.183
DH5	2.905	9	0.261	0.4	-0.139
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.42	64	0.269	0.4	-0.131
DH3	1.668	21	0.350	0.4	-0.050
DH5	2.905	13	0.378	0.4	-0.022

**PULSE WIDTH - DH1**

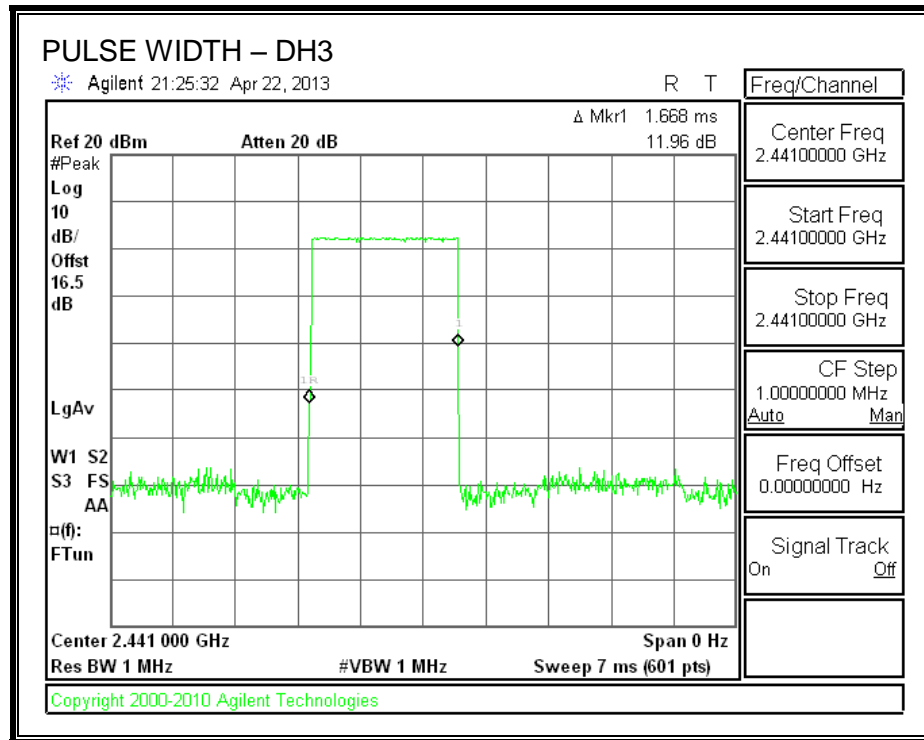




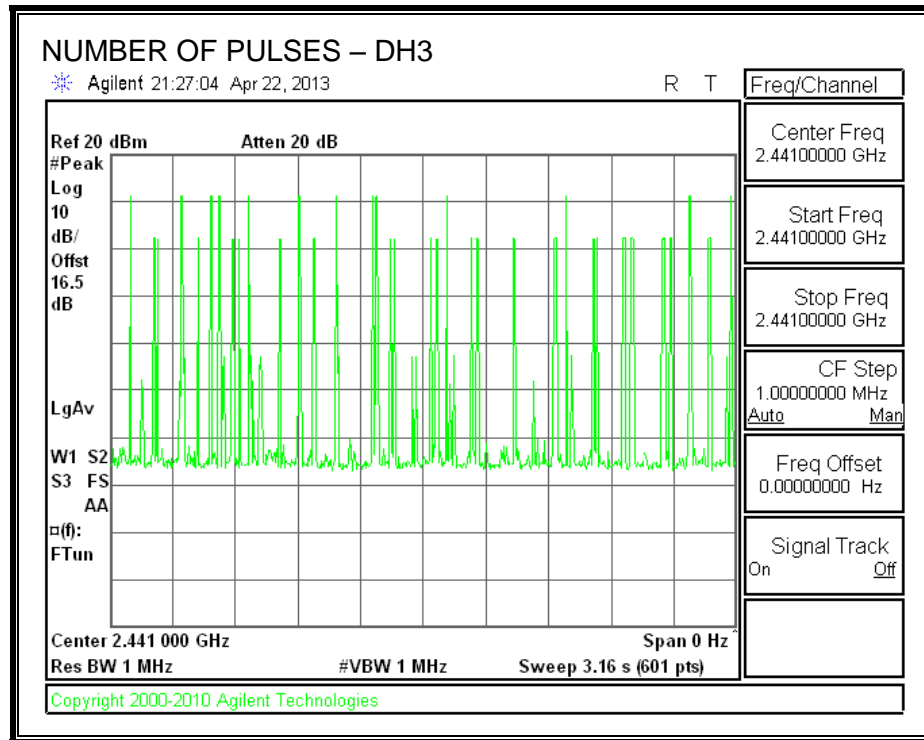
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1**



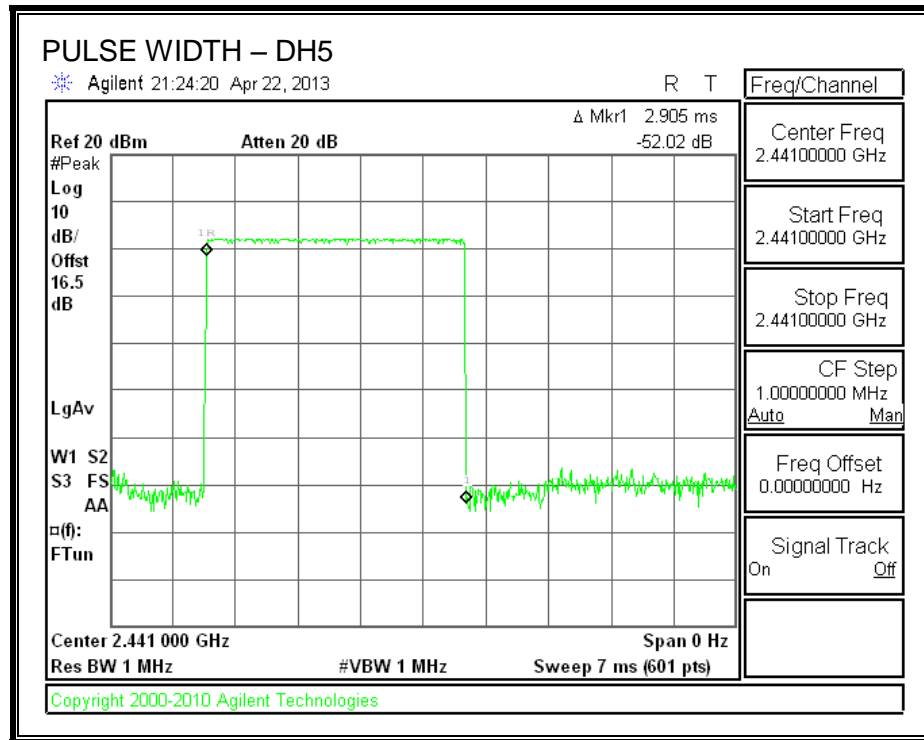
### PULSE WIDTH – DH3



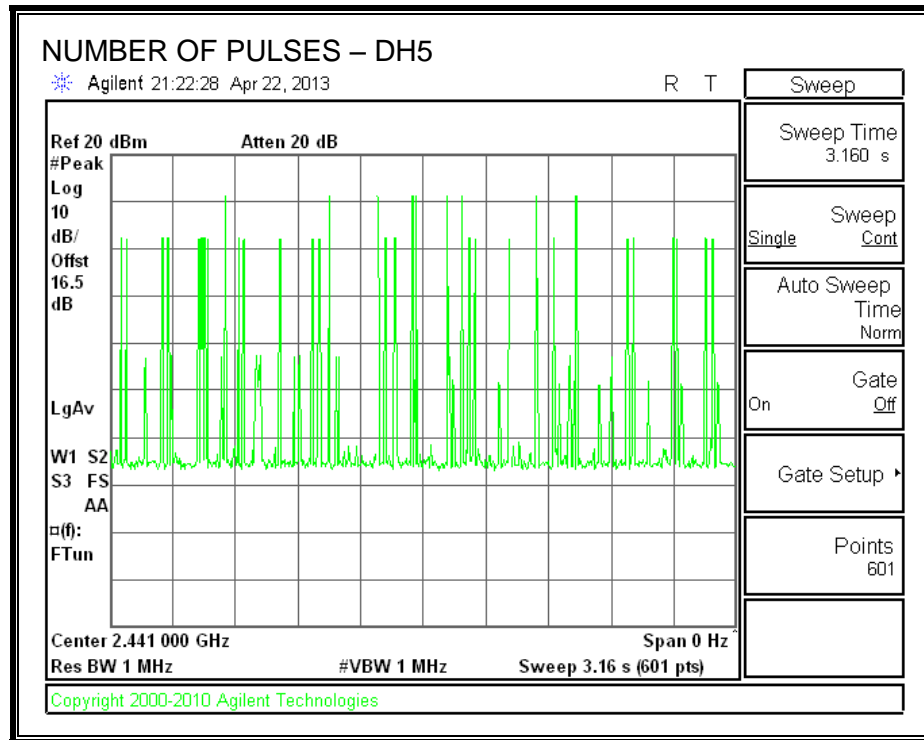
**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3**



**PULSE WIDTH – DH5**



**NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5**



### 7.1.5. OUTPUT POWER

#### LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

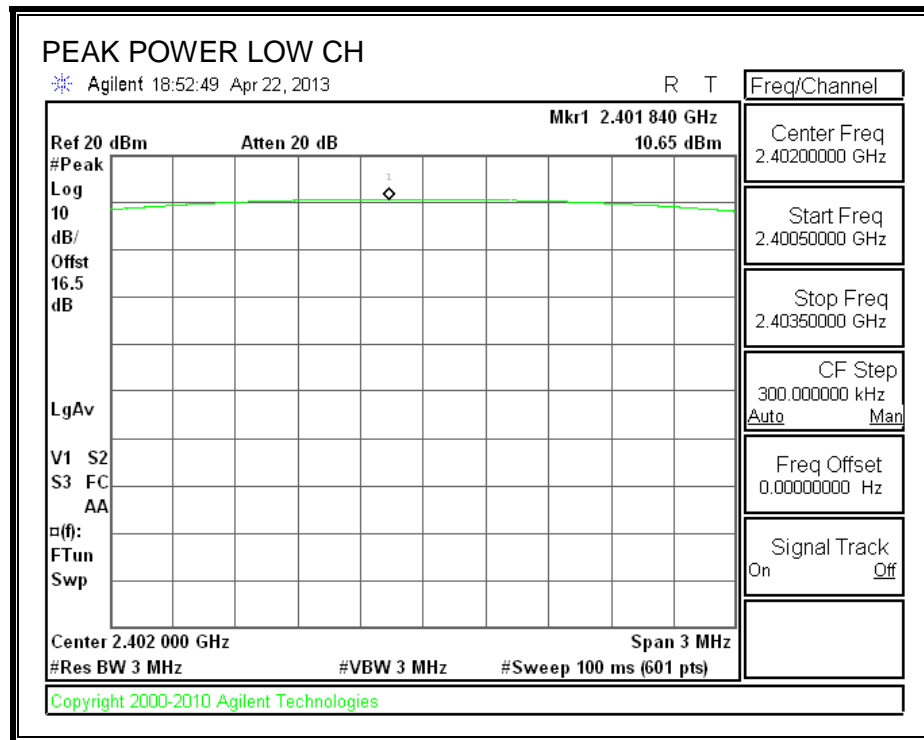
#### TEST PROCEDURE

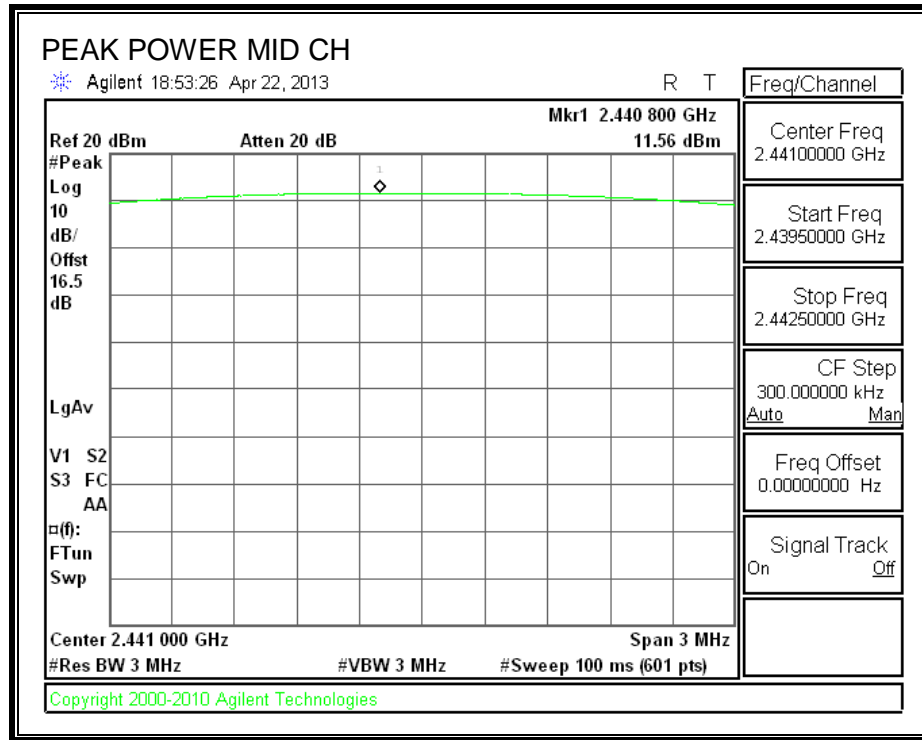
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

#### RESULTS

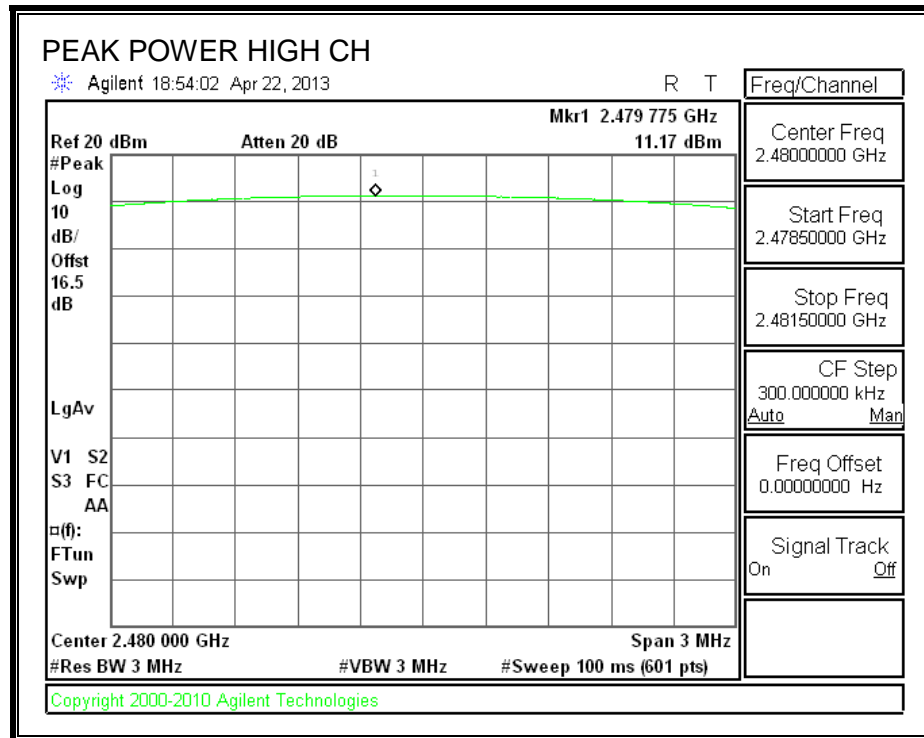
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.65	30	-19.35
Middle	2441	11.56	30	-18.44
High	2480	11.17	30	-18.83

## OUTPUT POWER









### 7.1.6. AVERAGE POWER

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 16.5 dB (including 16 dB pad and .5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.80
Middle	2441	11.10
High	2480	11.10

### **7.1.7. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

#### **TEST PROCEDURE**

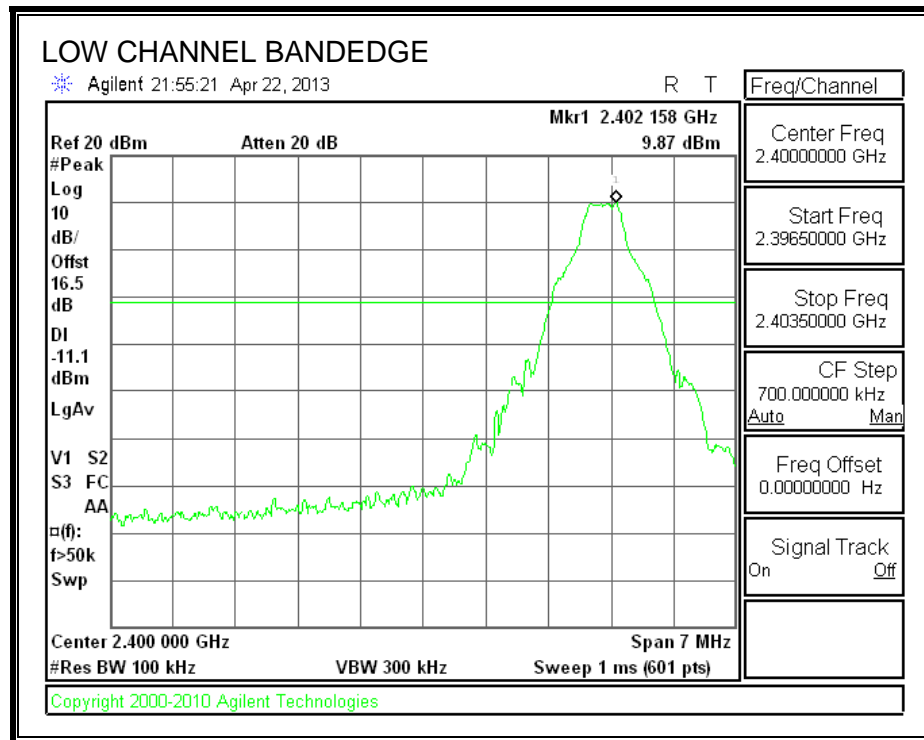
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

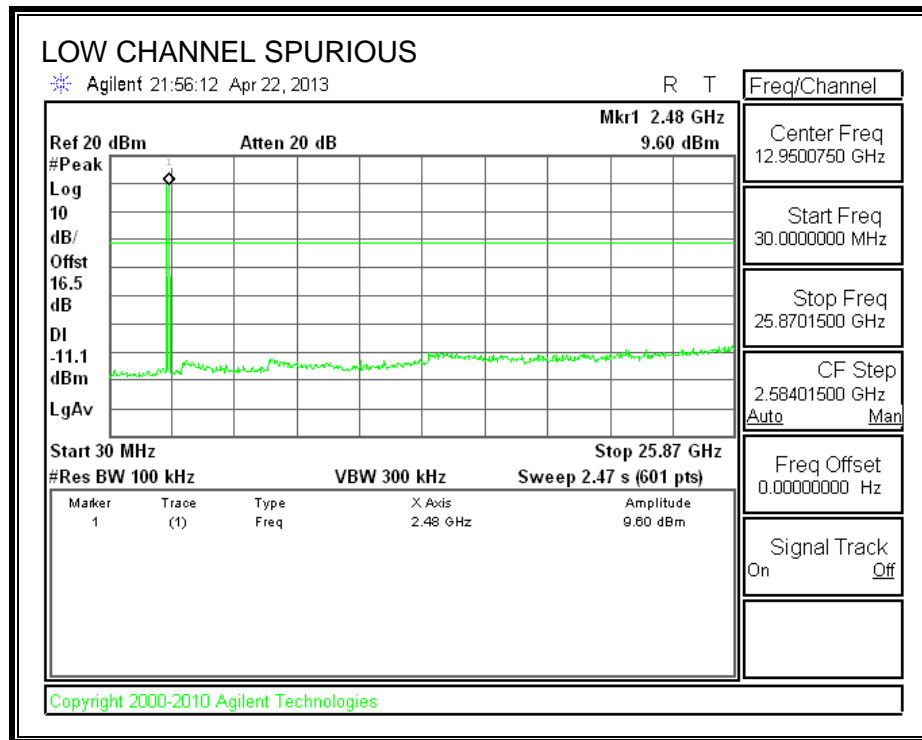
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

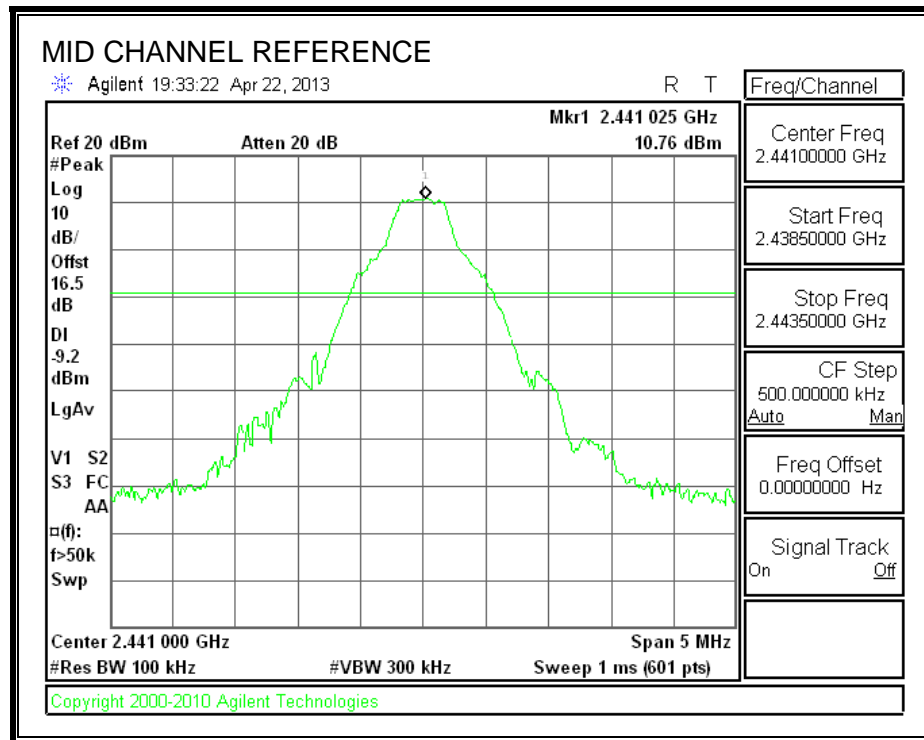
#### **RESULTS**

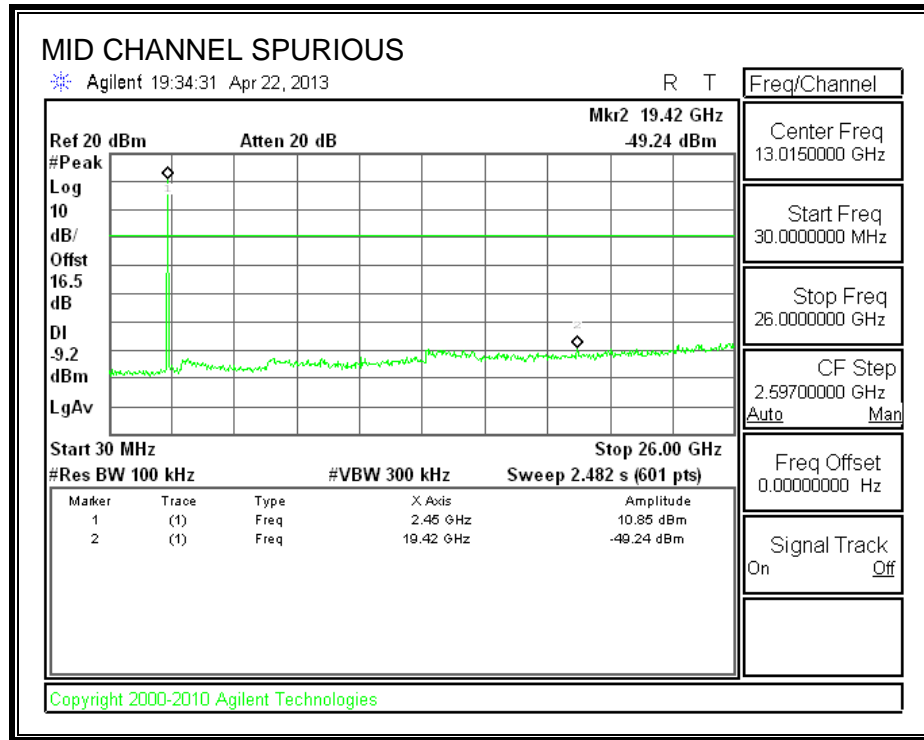
**SPURIOUS EMISSIONS, LOW CHANNEL**



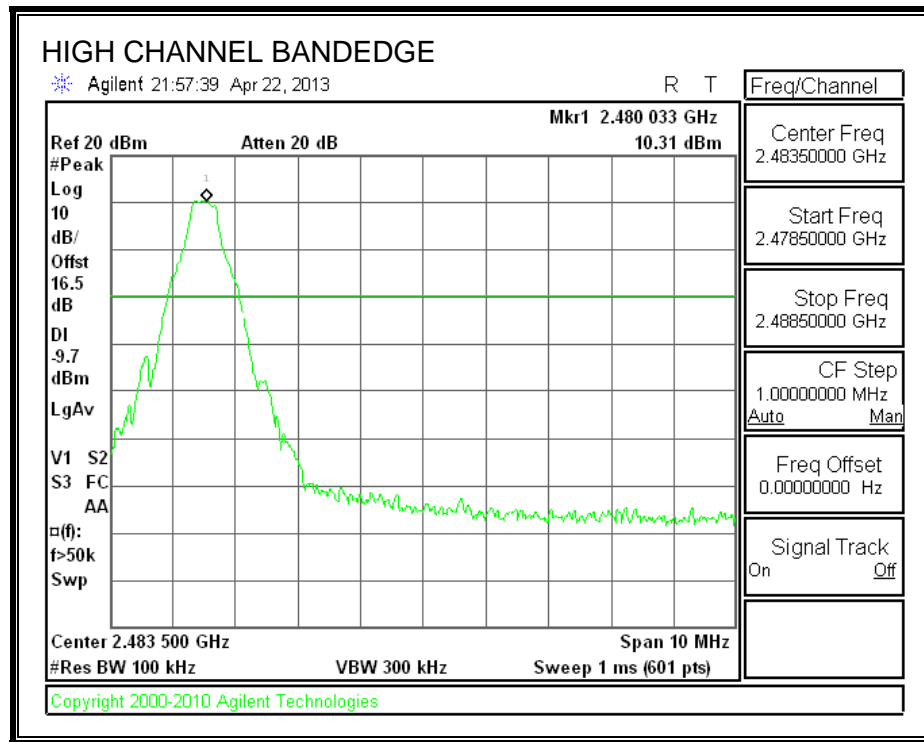


**SPURIOUS EMISSIONS, MID CHANNEL**

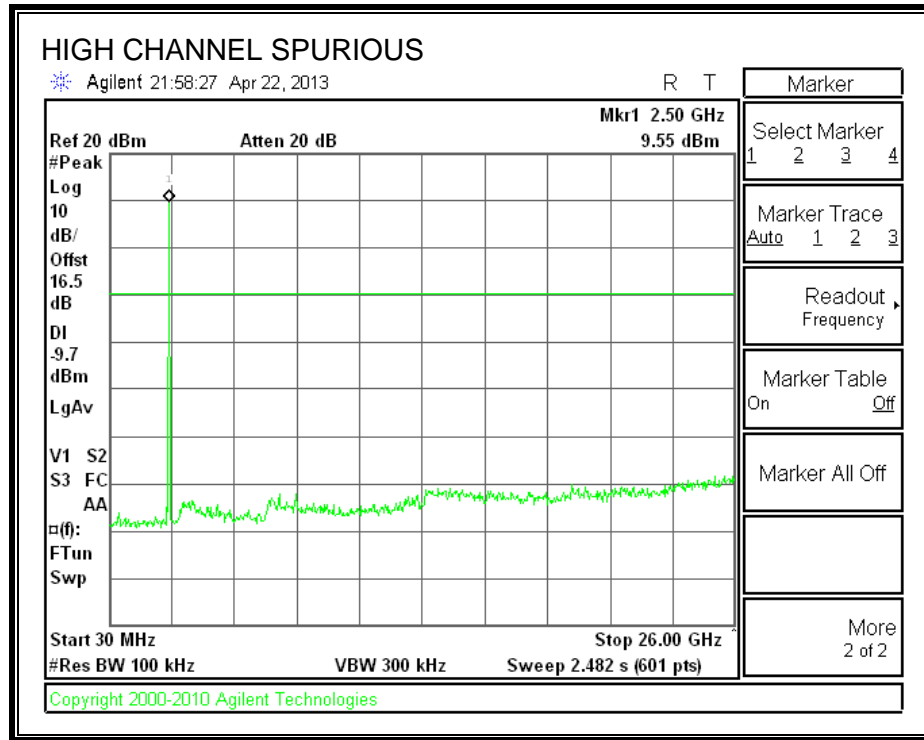




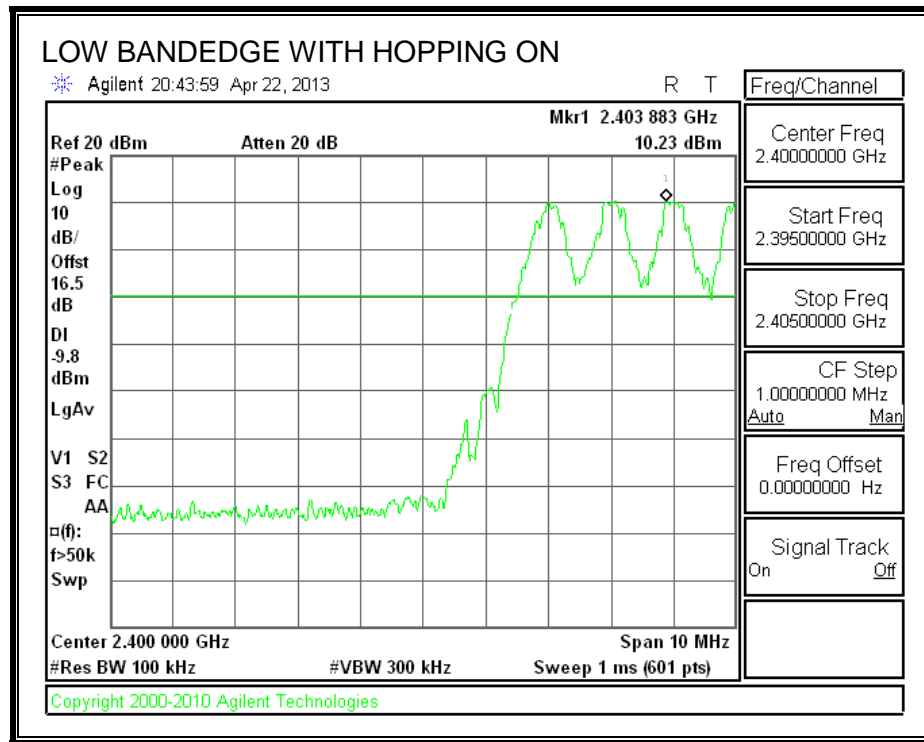
**SPURIOUS EMISSIONS, HIGH CHANNEL**

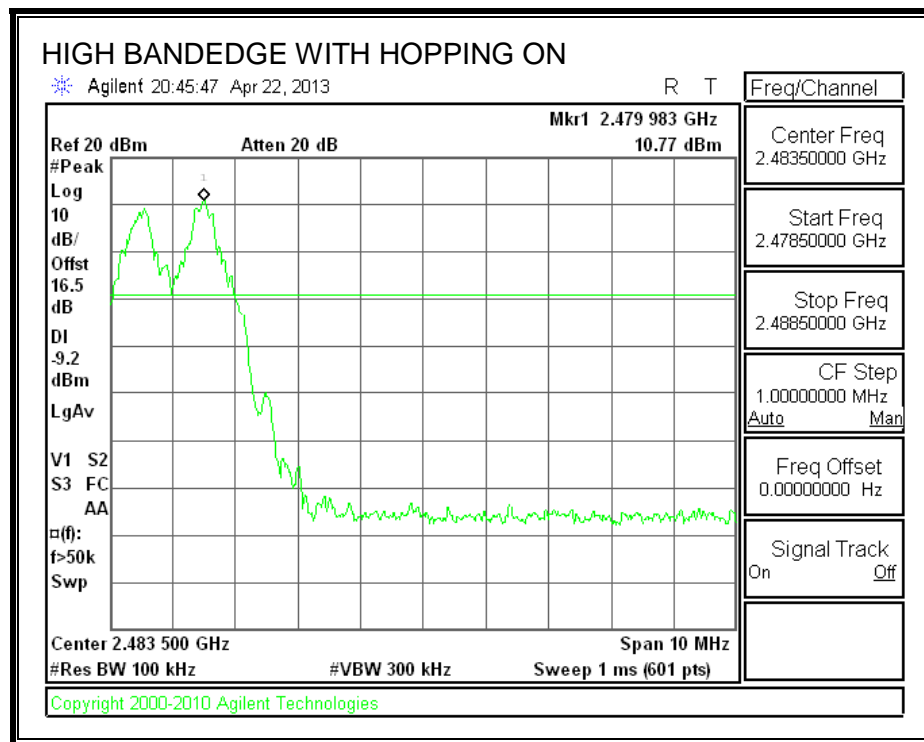






**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**





## **7.2. ENHANCED DATA RATE 8PSK MODULATION**

### **7.2.1. 20 dB AND 99% BANDWIDTH**

#### **LIMIT**

None; for reporting purposes only.

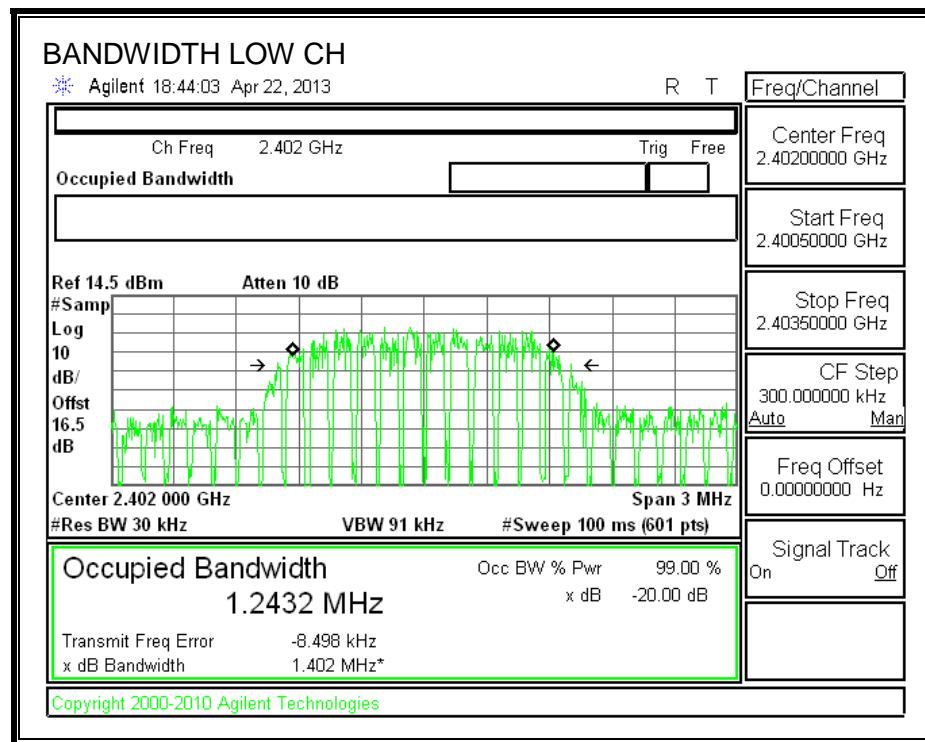
#### **TEST PROCEDURE**

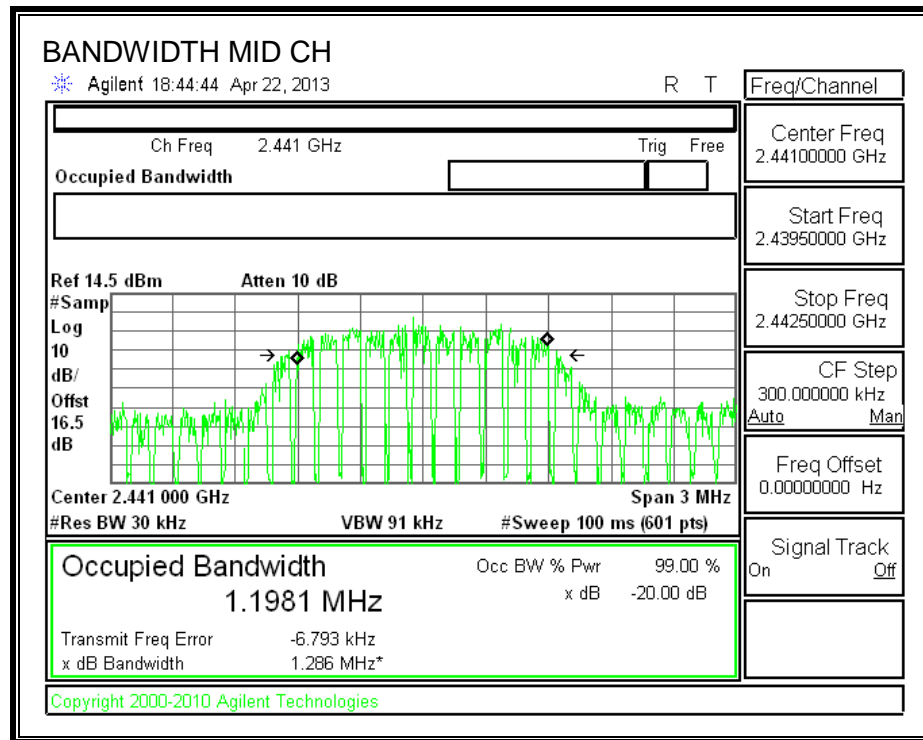
The transmitter output is connected to a spectrum analyzer. The RBW is set to  $\geq 1\%$  of the 20 dB bandwidth. The VBW is set to  $\geq$  RBW. The sweep time is coupled.

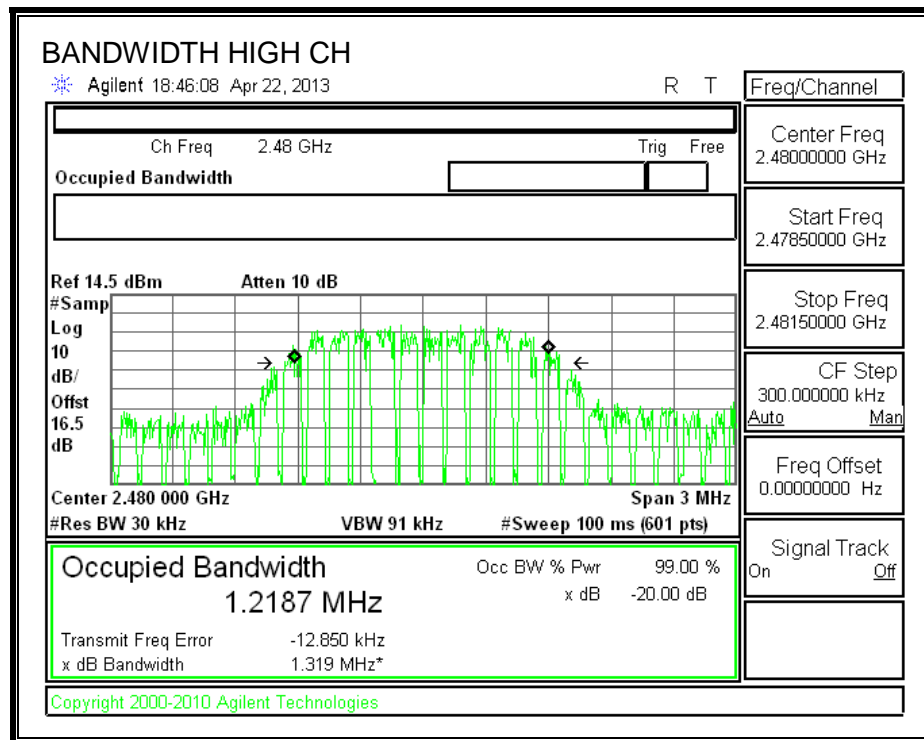
#### **RESULTS**

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	1.402
Middle	2441	1.296
High	2480	1.319

## 20 dB BANDWIDTH







## 7.2.2. OUTPUT POWER

### LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

### TEST PROCEDURE

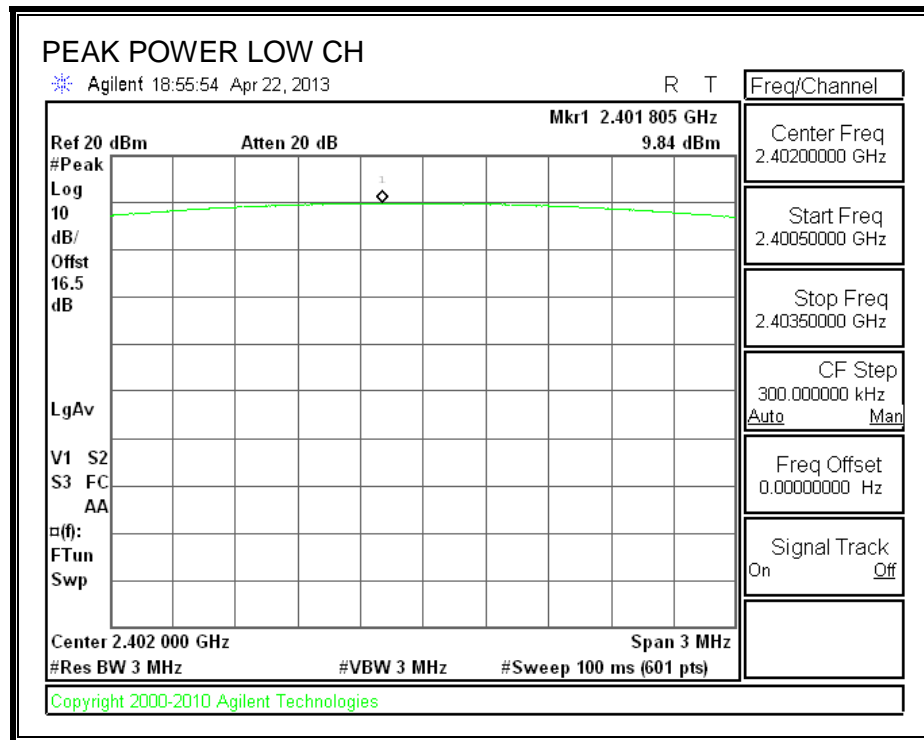
The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

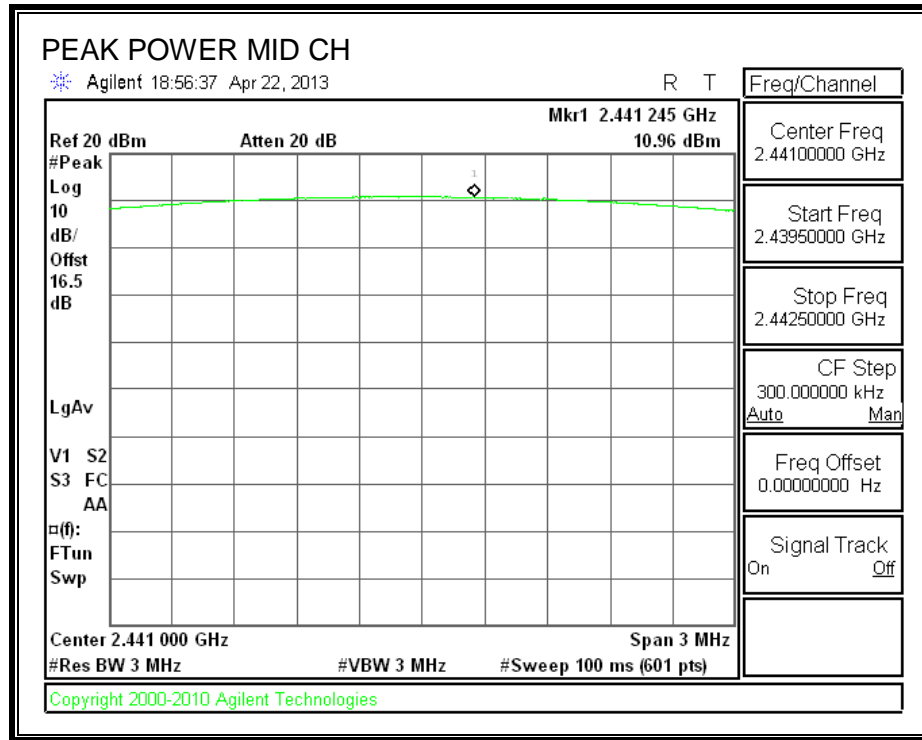
### RESULTS

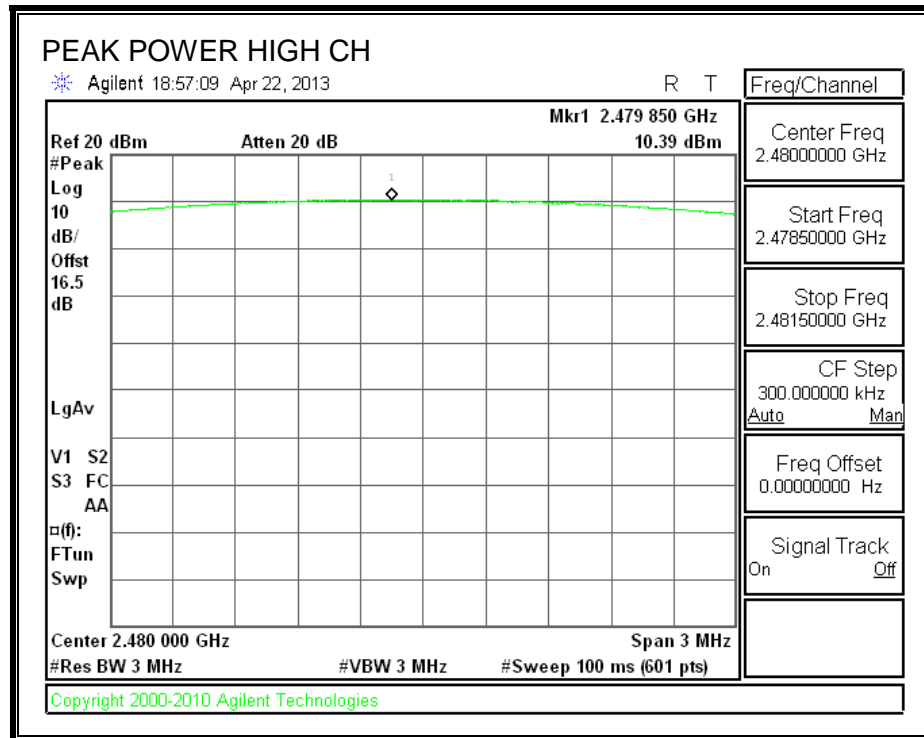
Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.84	30	-20.16
Middle	2441	10.96	30	-19.04
High	2480	10.39	30	-19.61



## OUTPUT POWER







### 7.2.3. AVERAGE POWER

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 16.5 dB (including 16 dB pad and .05 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	7.50
Middle	2441	7.90
High	2480	7.60

## **7.2.4. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Limit = -20 dBc

### **TEST PROCEDURE**

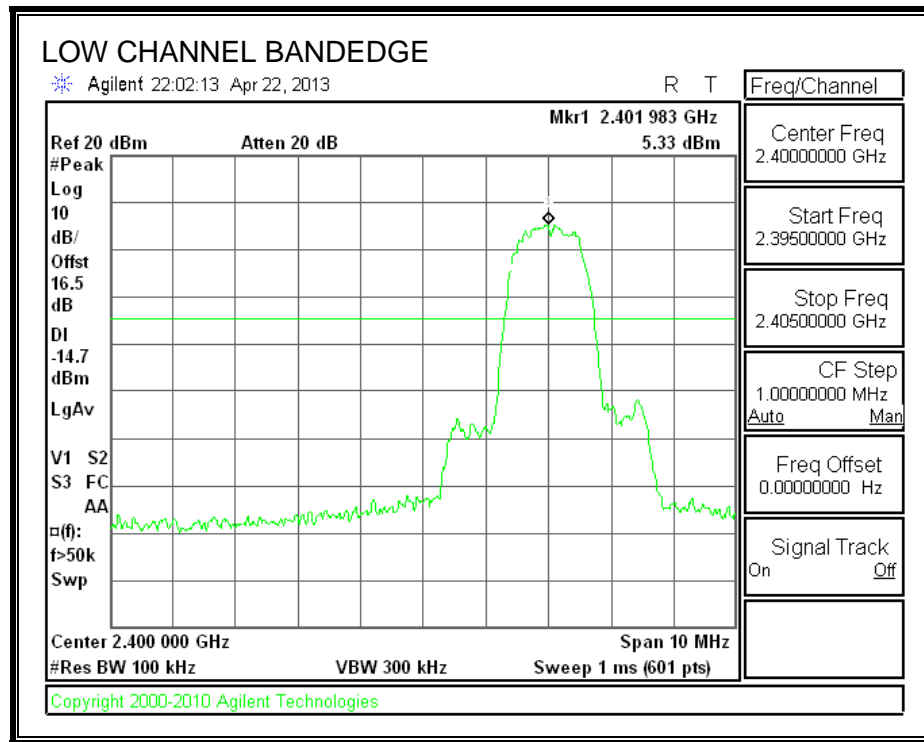
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

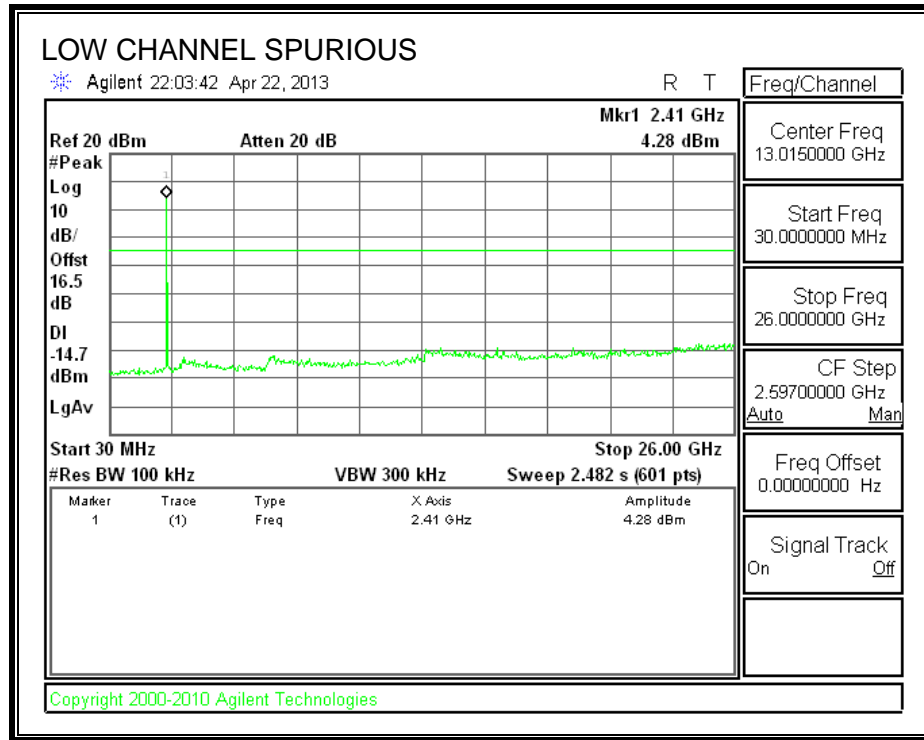
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

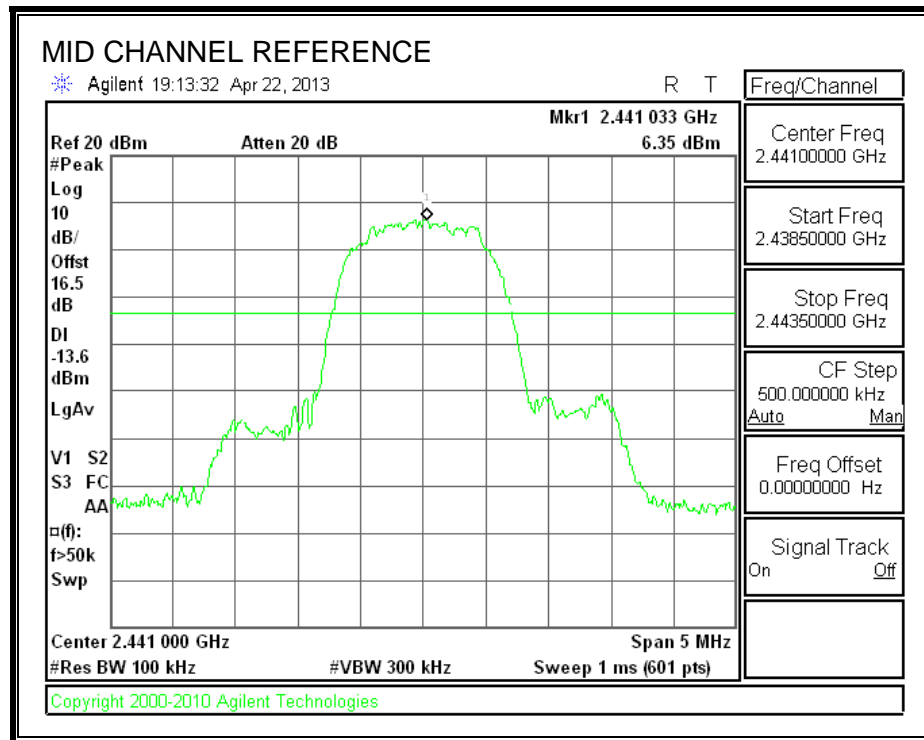
### **RESULTS**

**SPURIOUS EMISSIONS, LOW CHANNEL**

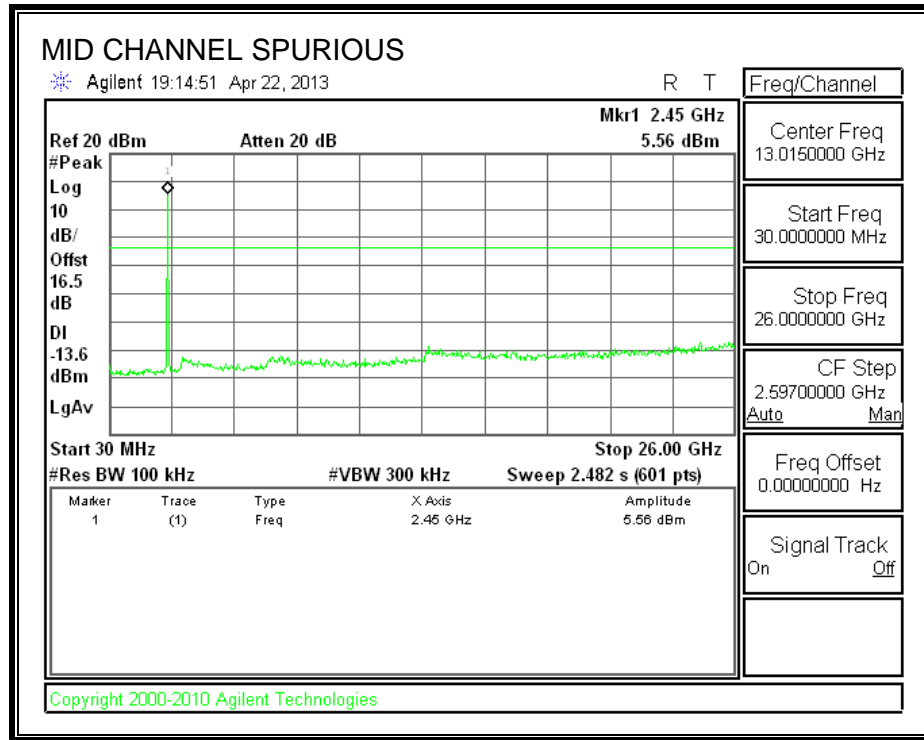




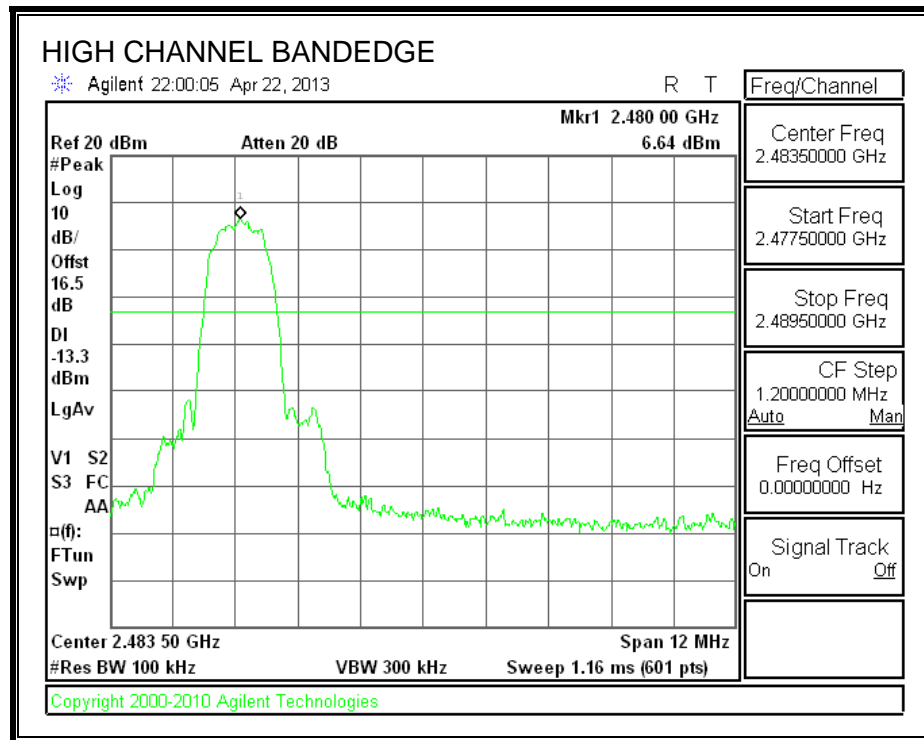
**SPURIOUS EMISSIONS, MID CHANNEL**

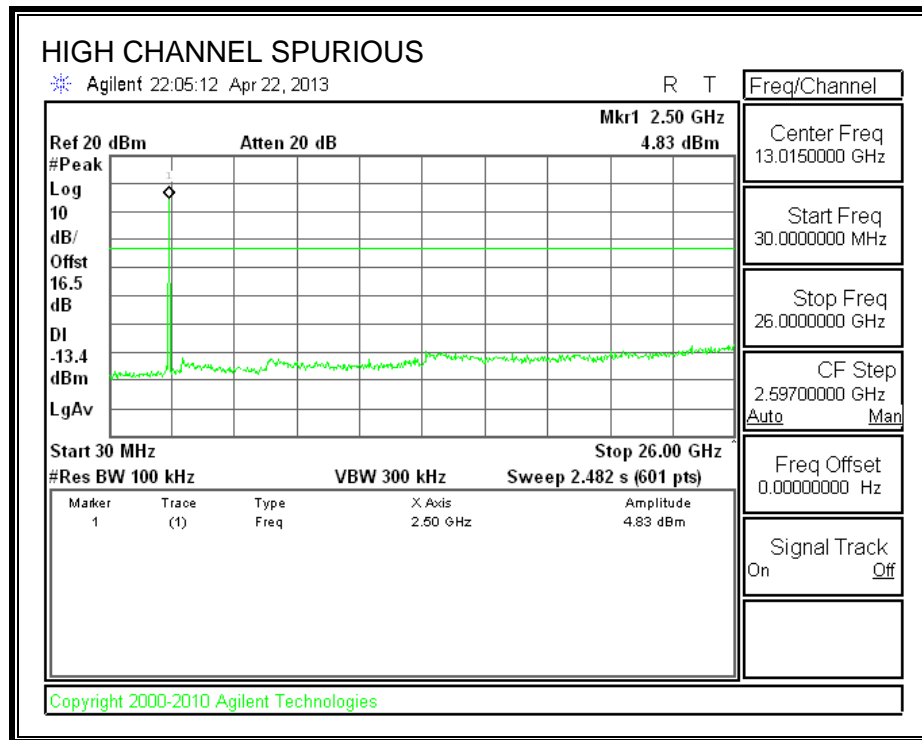




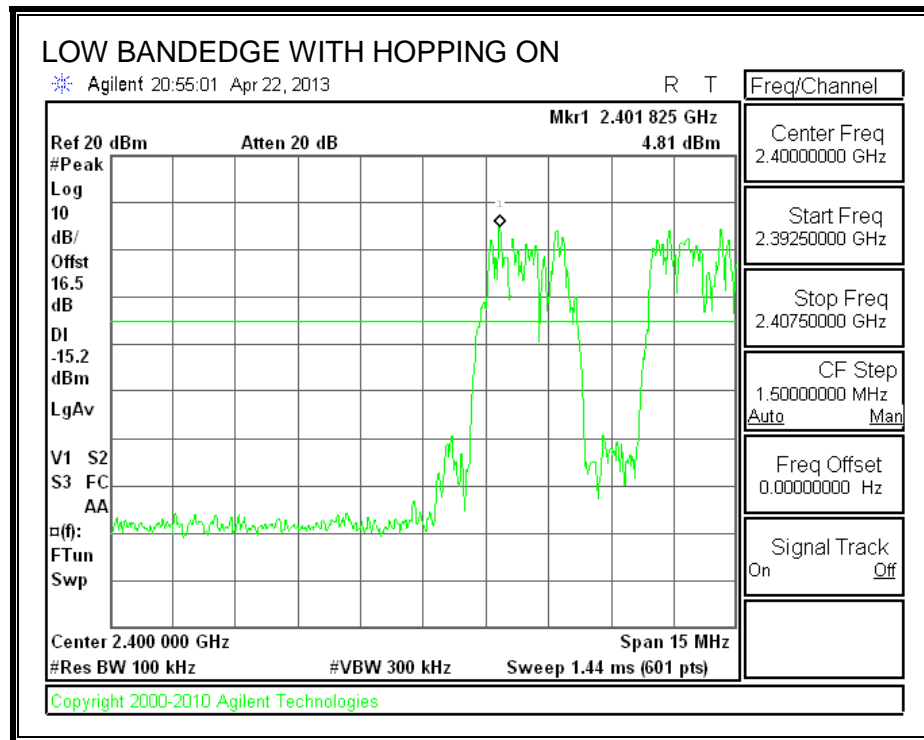


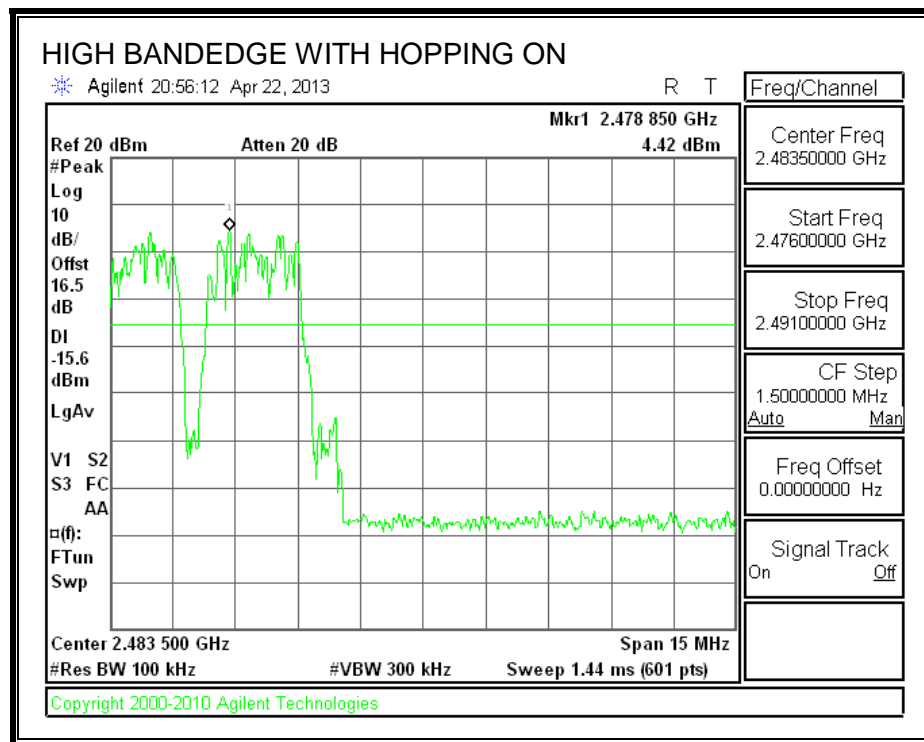
**SPURIOUS EMISSIONS, HIGH CHANNEL**





**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**





## 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 10 Hz for average measurements.

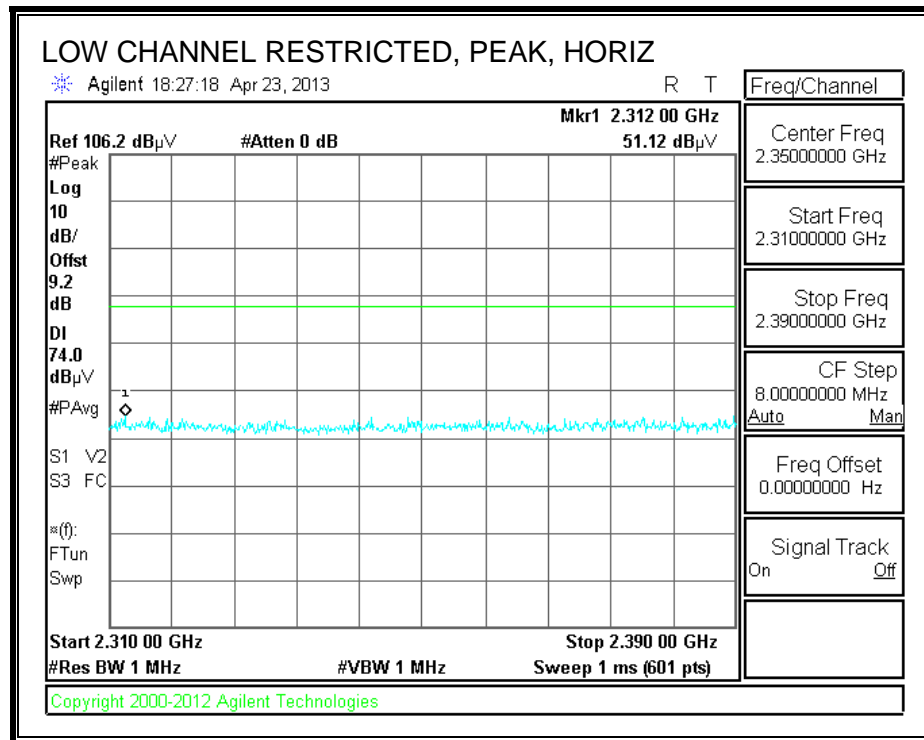
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

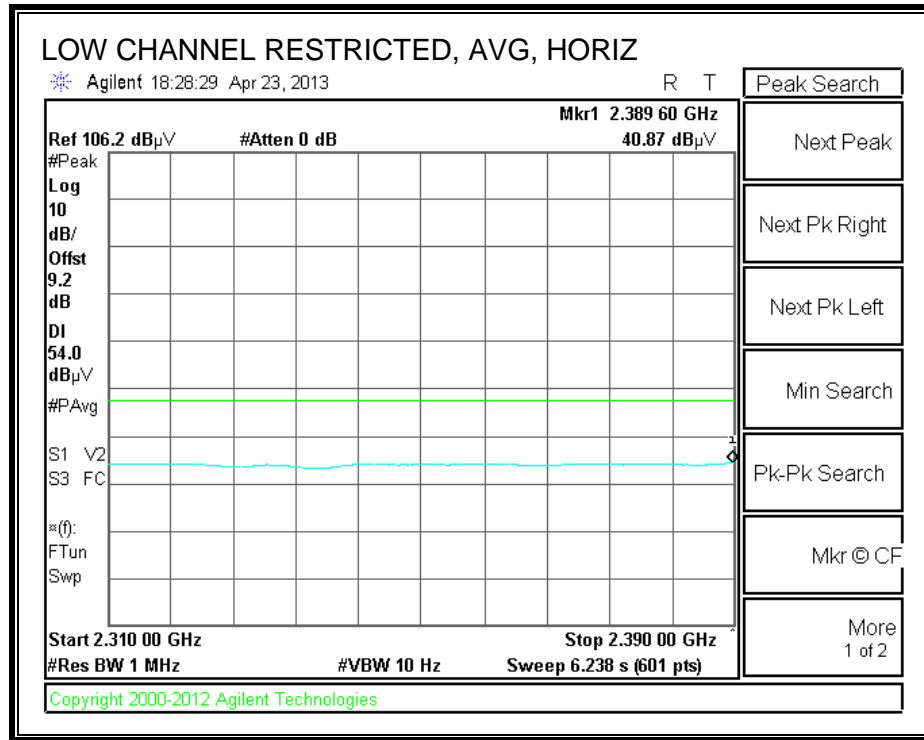
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

## 8.2. TRANSMITTER ABOVE 1 GHz

### 8.2.1. BASIC DATA RATE GFSK MODULATION

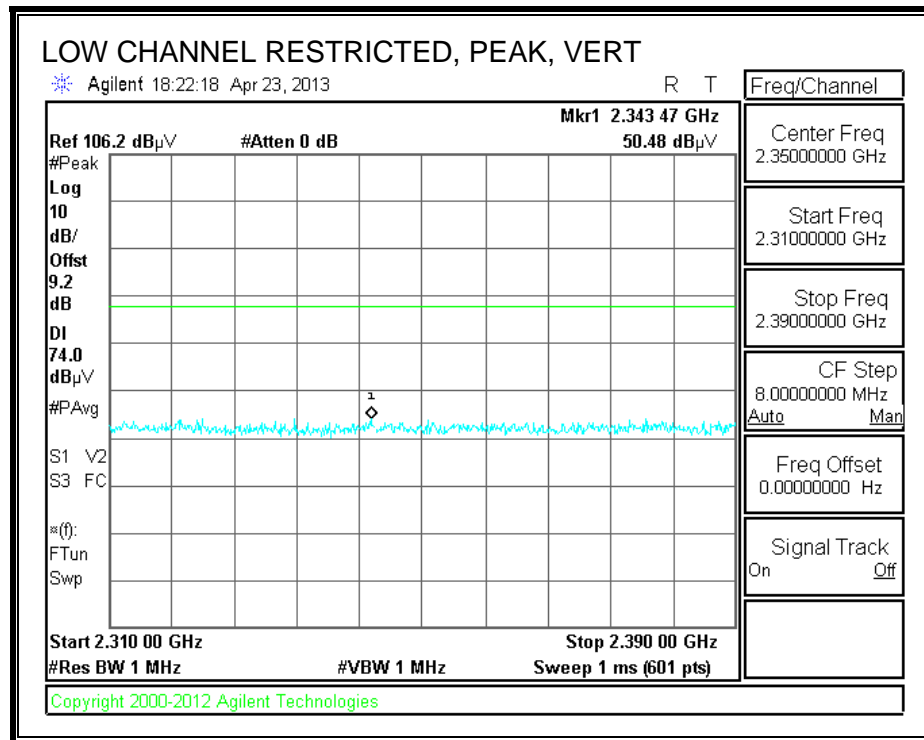
#### RESTRICTED BANDEGE (LOW CHANNEL, HORIZONTAL)

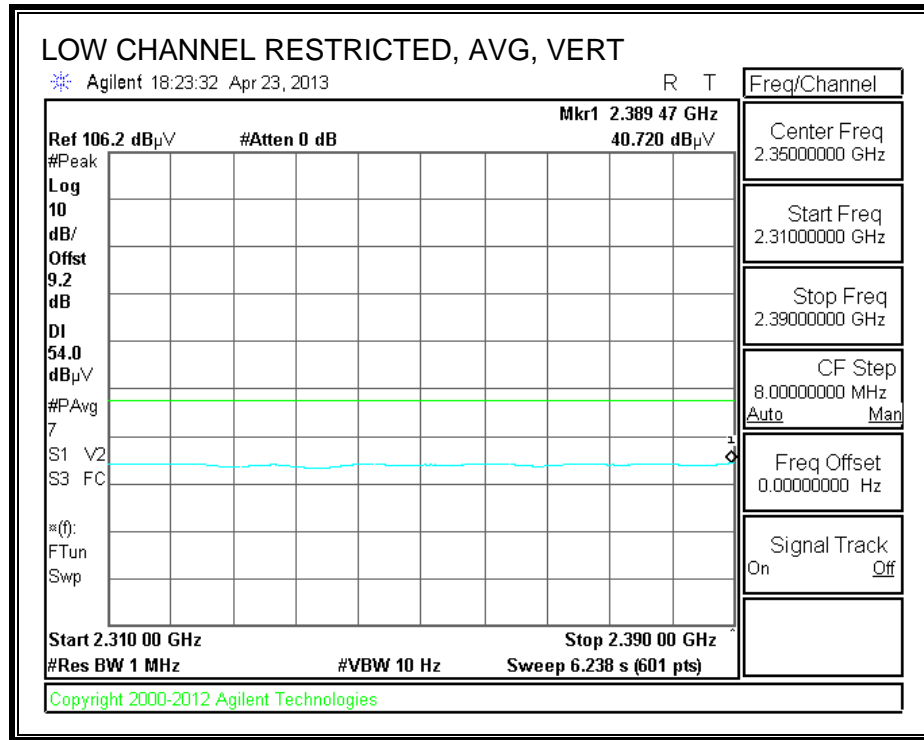




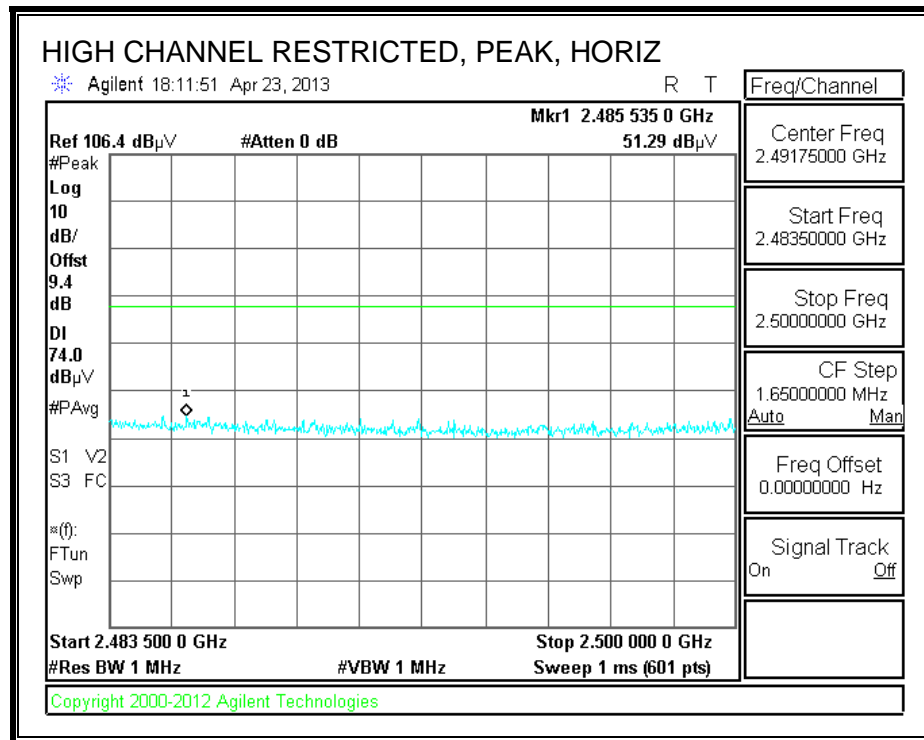


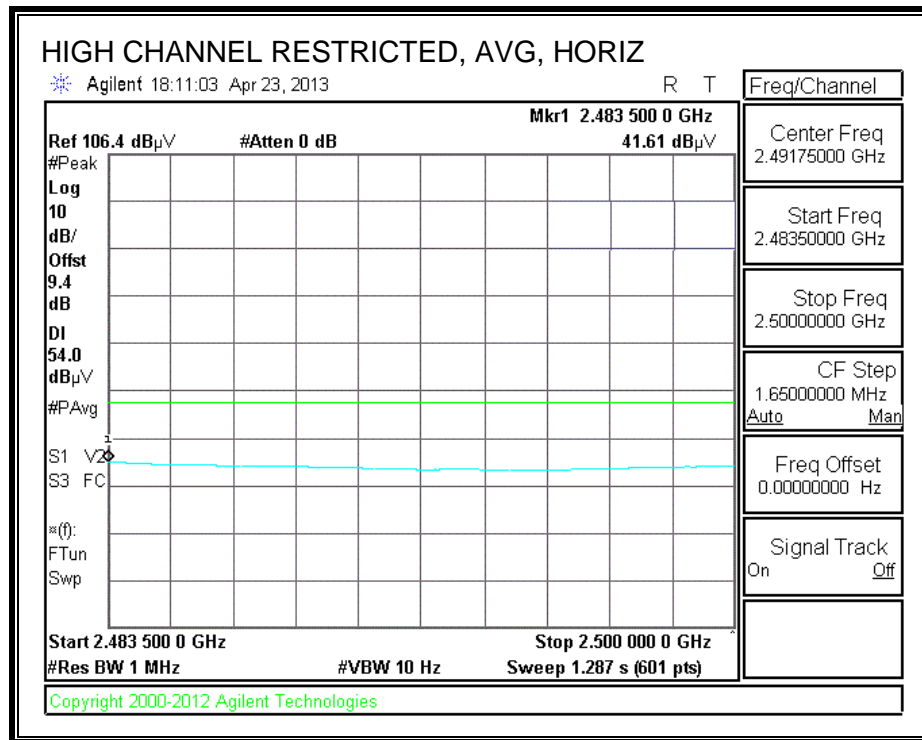
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



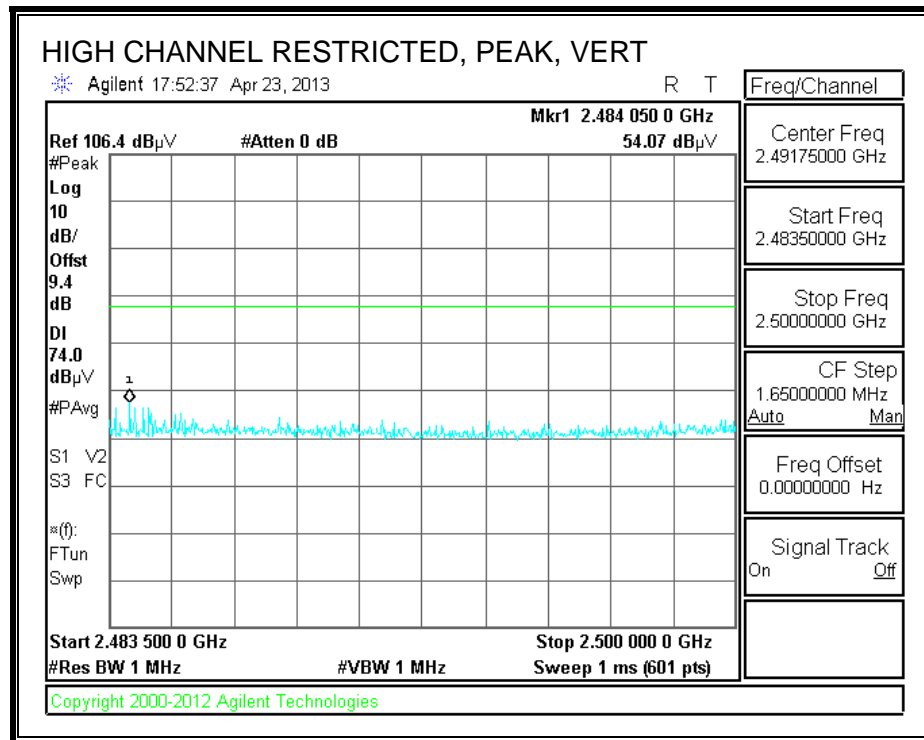


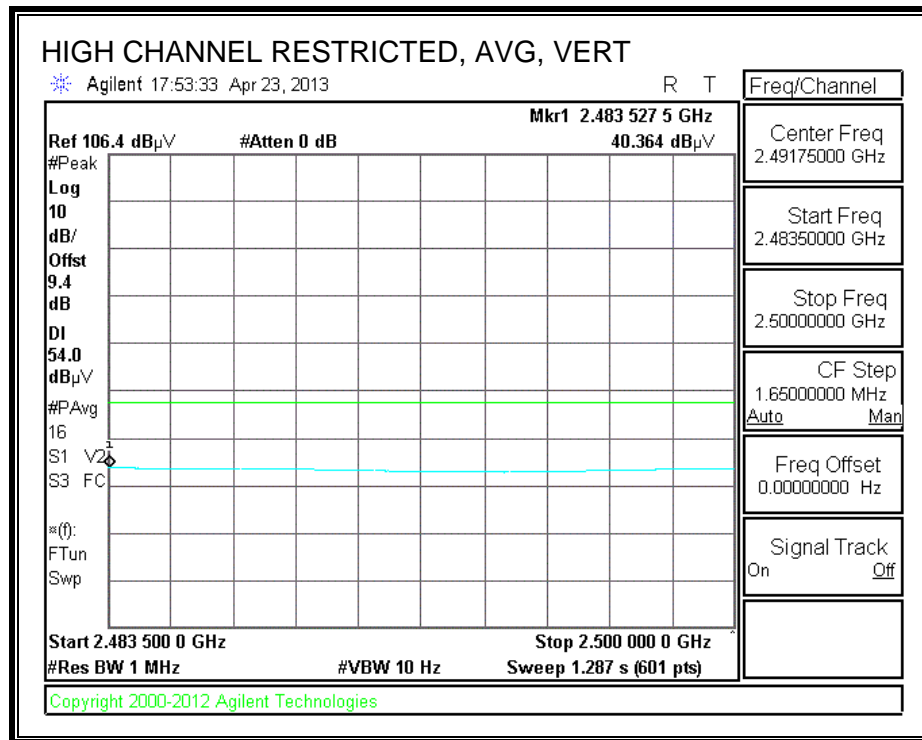
**RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)**





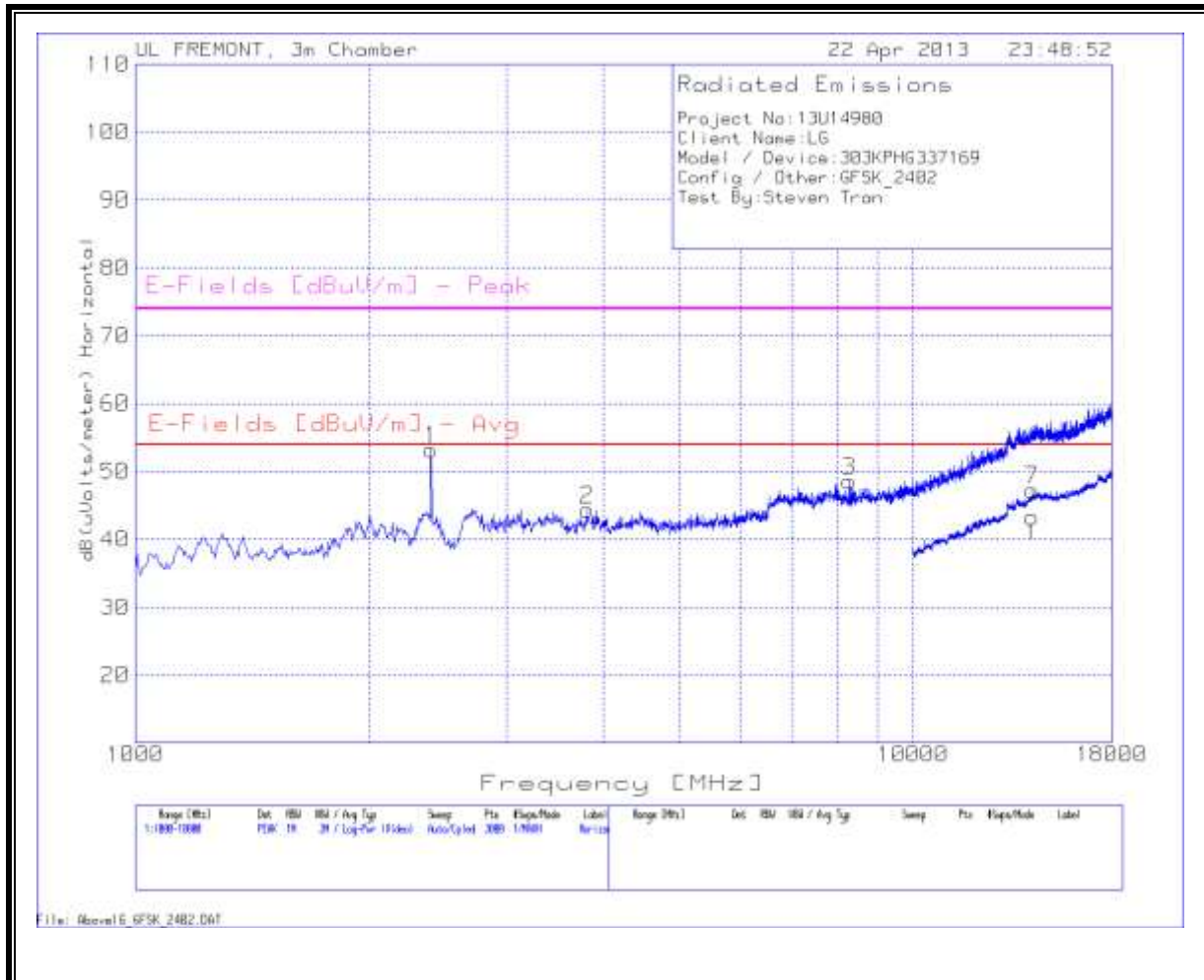
**RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)**





## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL HORIZONTAL

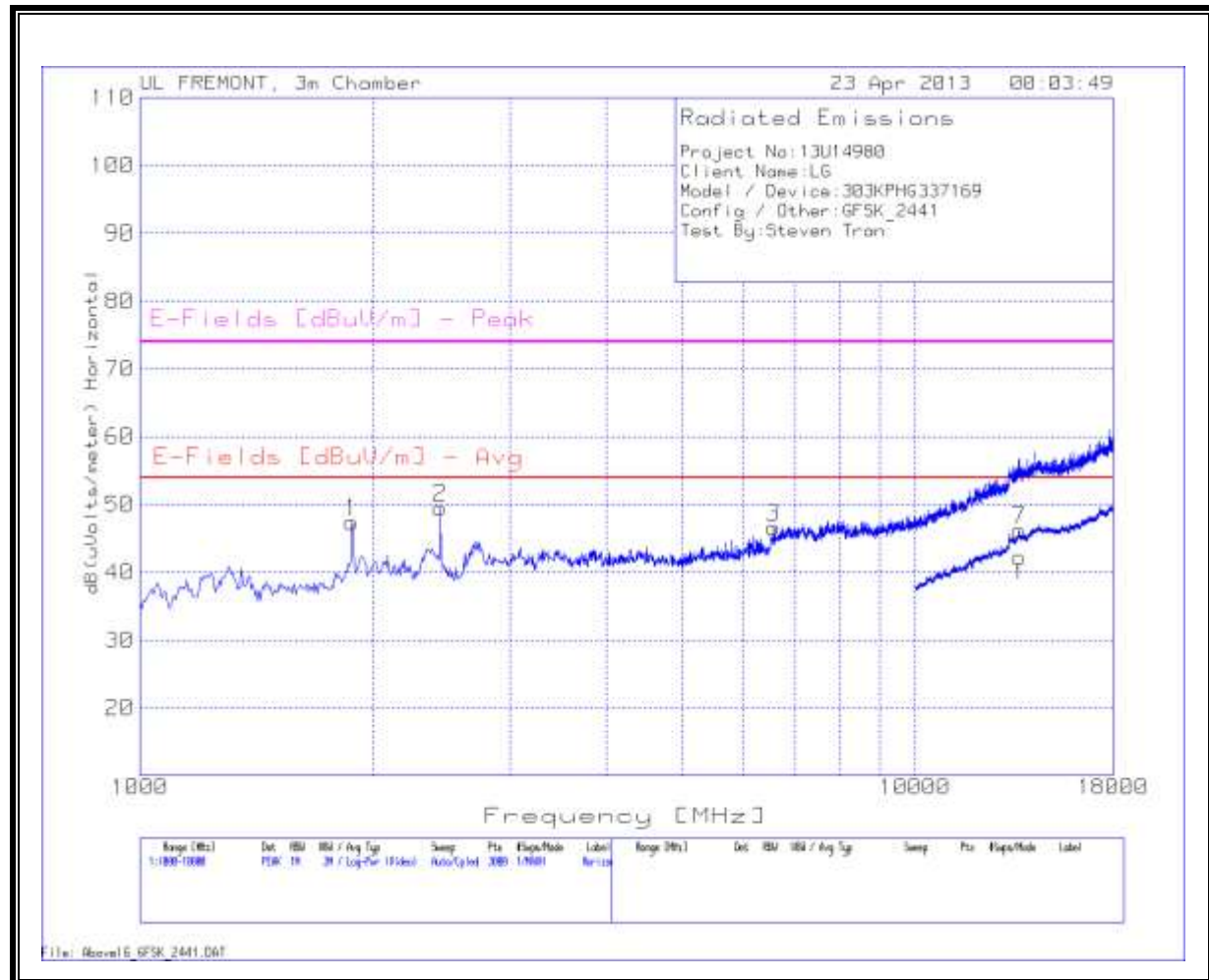


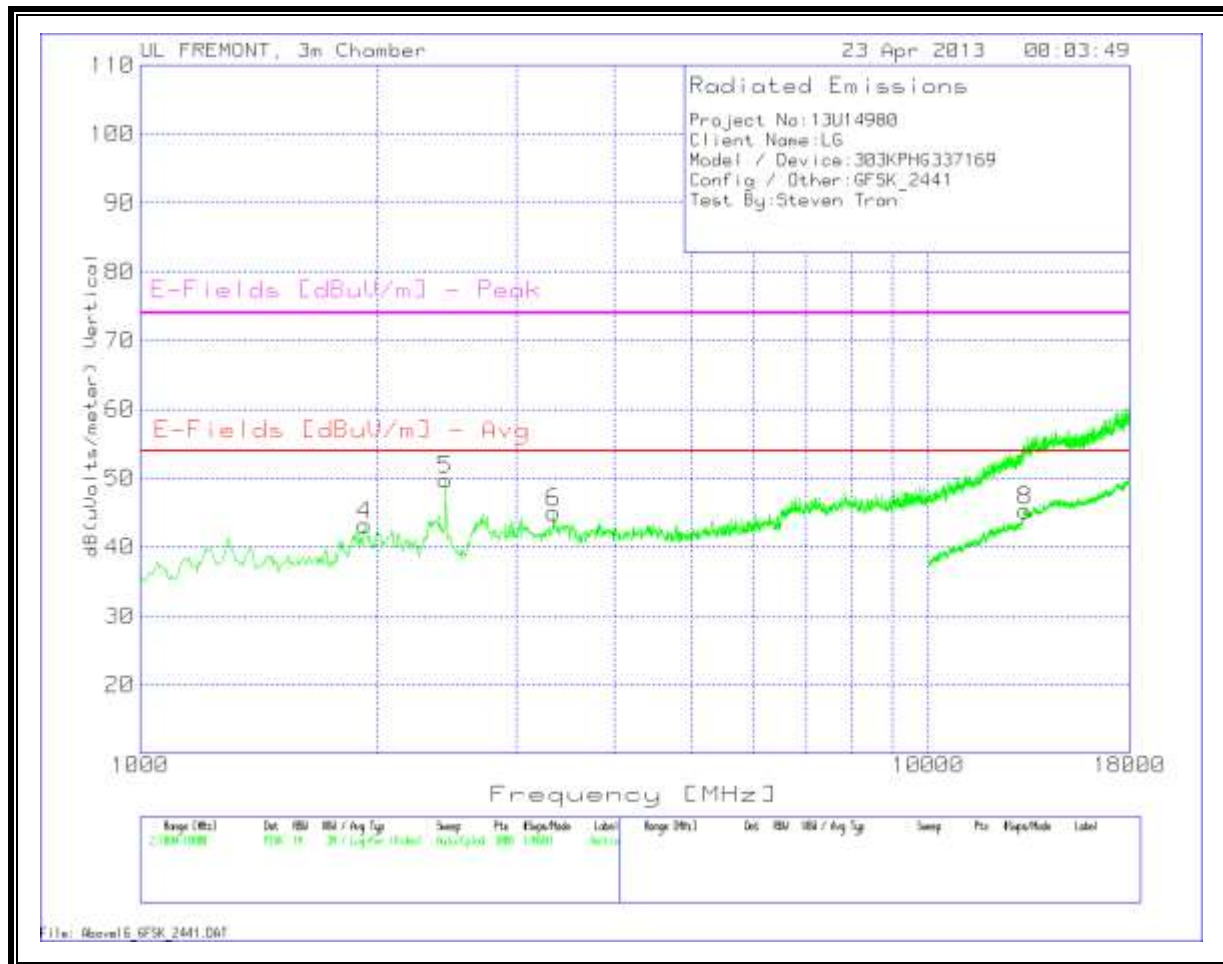




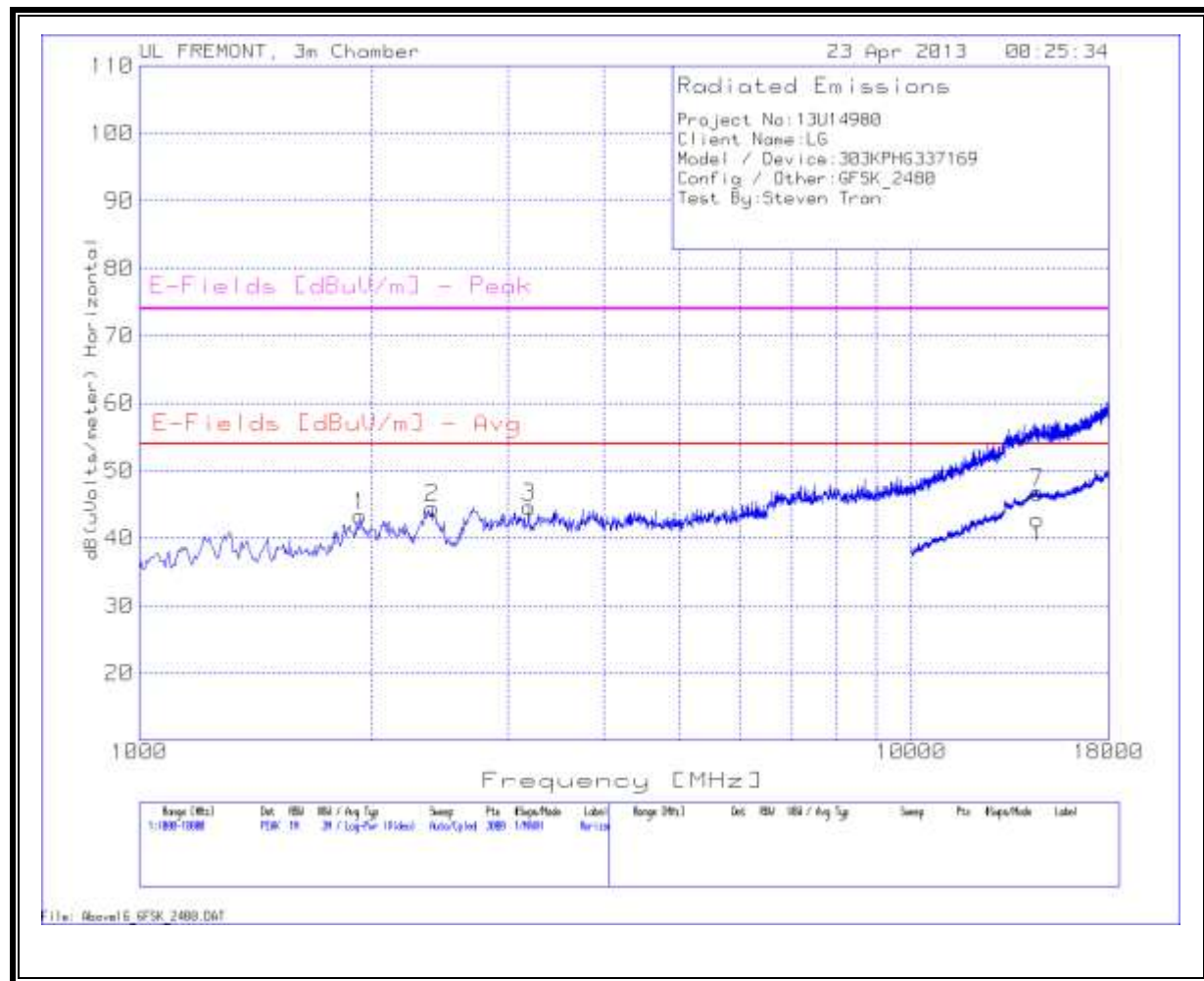
Project No:13U14980											
Client Name:LG											
Model / Device:303KPHG337169											
Config / Other:GFSK_2402											
Test By:Steven Tran											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
<b>Horizontal 1000 - 18000MHz</b>											
1	2398.734	49.94	PK	32.1	-29.7	0.9	53.24	53.97	-0.73	74	-20.76
2	3808.794	37.23	PK	33.2	-26.5	0.5	44.43	53.97	-9.54	74	-29.57
3	8282.478	34.75	PK	35.8	-22.2	0.3	48.65	53.97	-5.32	74	-25.35
<b>Vertical 1000 - 18000MHz</b>											
4	2398.734	50.14	PK	32.1	-29.7	0.9	53.44	53.97	-0.53	74	-20.56
5	2761.159	40.29	PK	32.7	-28.9	0.9	44.99	53.97	-8.98	74	-29.01
6	4561.959	35.67	PK	34	-25.5	0.2	44.37	53.97	-9.6	74	-29.63
<b>Horizontal 10000 - 18000MHz</b>											
7	14225.887	23.43	PK	39.2	-15.8	0.4	47.23	53.97	-6.74	74	-26.77
<b>Vertical 10000 - 18000MHz</b>											
8	13590.205	22.87	PK	38.9	-16.2	0.4	45.97	53.97	-8	74	-28.03
PK - Peak detector											
Av - Average detector											

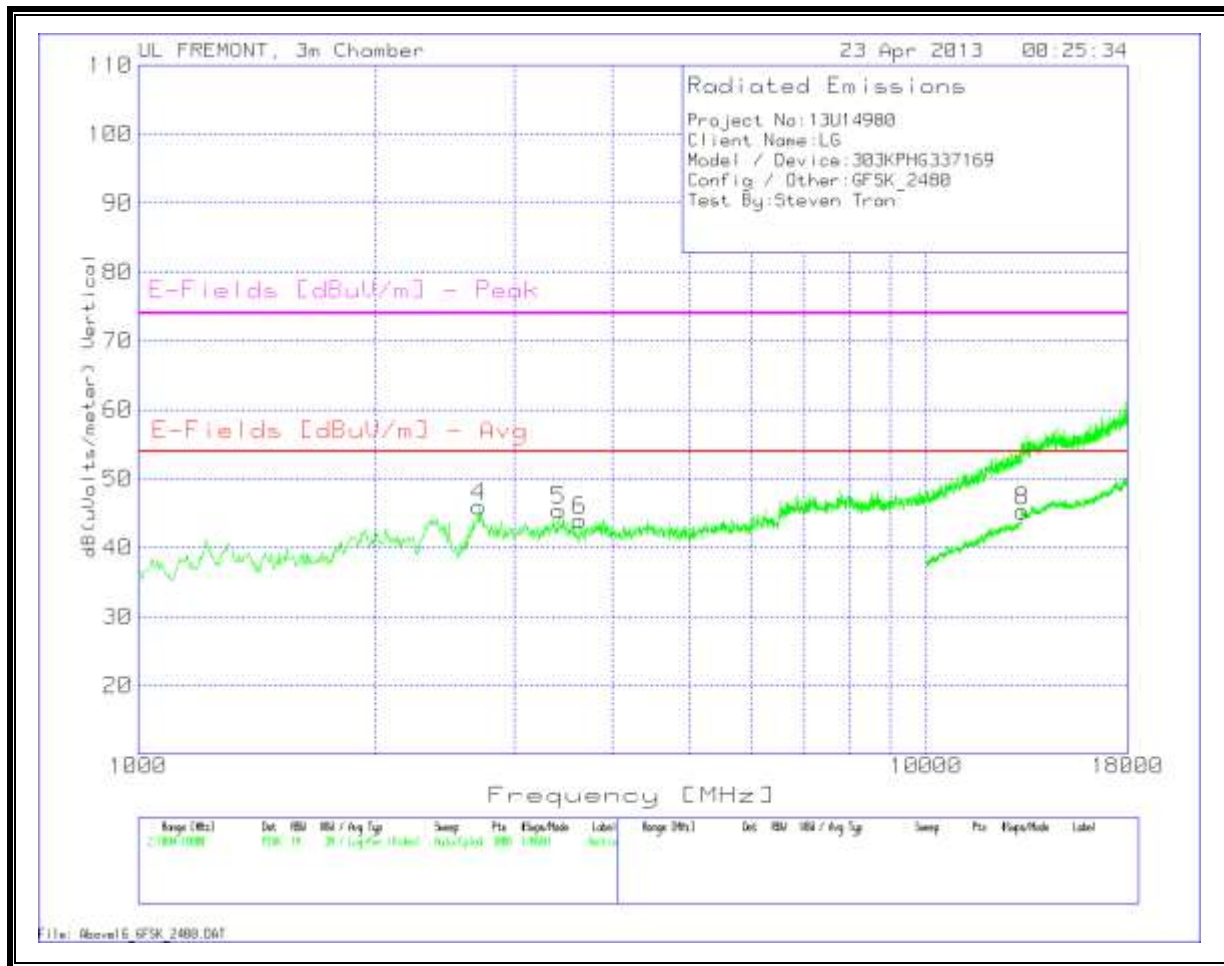
MID CHANNEL  
HORIZONTAL





Project No:13U14980											
Client Name:LG											
Model / Device:303KPHG337169											
Config / Other:GFSK_2441											
Test By:Steven Tran											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
Horizontal 1000 - 18000MHz											
1	1877.748	46.56	PK	31	-31	0.8	47.36	53.97	-6.61	74	-26.64
2	2438.374	46.05	PK	32.2	-29.6	0.9	49.55	53.97	-4.42	74	-24.45
3	6566.622	34.23	PK	35.6	-23.5	0.3	46.63	53.97	-7.34	74	-27.37
Vertical 1000 - 18000MHz											
4	1928.714	41.82	PK	31.3	-30.8	0.9	43.22	53.97	-10.75	74	-30.78
5	2438.374	46.35	PK	32.2	-29.6	0.9	49.85	53.97	-4.12	74	-24.15
6	3344.437	39.3	PK	32.9	-27.7	0.5	45	53.97	-8.97	74	-29
Horizontal 10000 - 18000MHz											
7	13634.183	23.08	PK	38.8	-16.1	0.4	46.18	53.97	-7.79	74	-27.82
Vertical 10000 - 18000MHz											
8	13274.363	22.45	PK	39.1	-16.7	0.4	45.25	53.97	-8.72	74	-28.75
PK - Peak detector											
Av - Average detector											

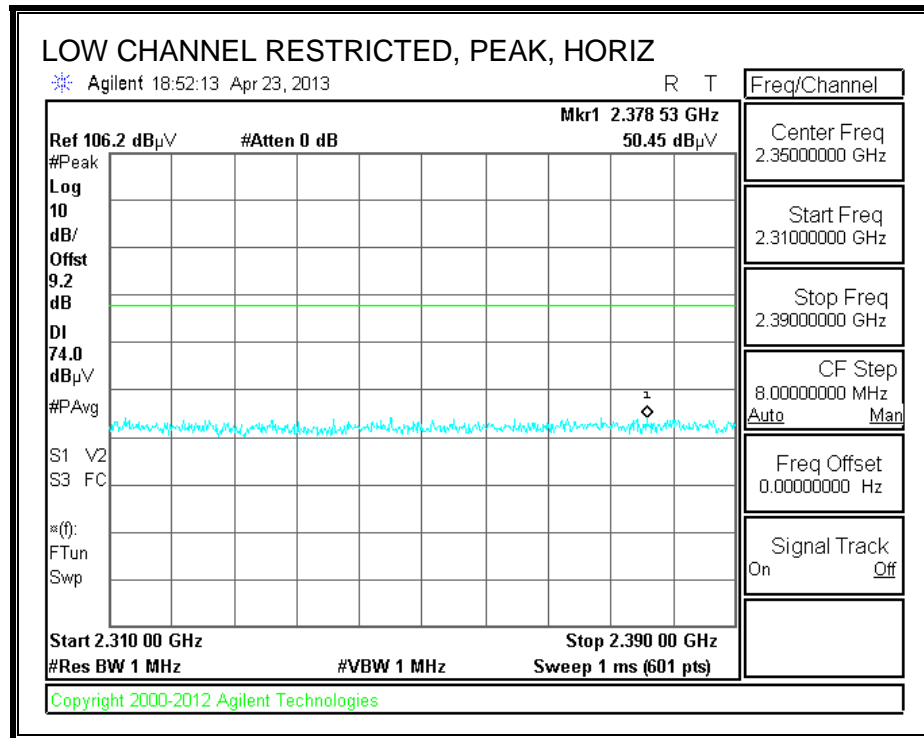




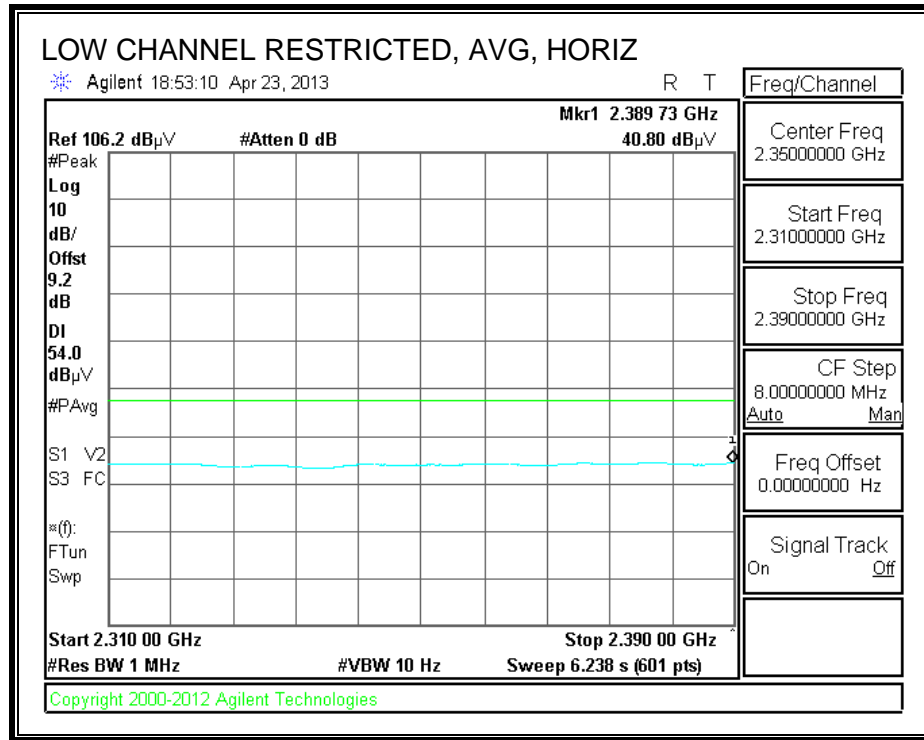
Project No:13U14980											
Client Name:LG											
Model / Device:303KPHG337169											
Config / Other:GFSK_2480											
Test By:Steven Tran											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)
<b>Horizontal 1000 - 18000MHz</b>											
1	1934.377	41.85	PK	31.4	-30.8	0.9	43.35	53.97	-10.62	74	-30.65
2	2393.071	41.15	PK	32.1	-29.7	0.9	44.45	53.97	-9.52	74	-29.55
3	3197.202	39.39	PK	32.9	-28.1	0.4	44.59	53.97	-9.38	74	-29.41
<b>Vertical 1000 - 18000MHz</b>											
4	2704.53	41.4	PK	32.6	-29	0.9	45.9	53.97	-8.07	74	-28.1
5	3418.055	39.56	PK	32.9	-27.4	0.4	45.46	53.97	-8.51	74	-28.54
6	3638.907	37.36	PK	33.1	-26.9	0.4	43.96	53.97	-10.01	74	-30.04
<b>Horizontal 10000 - 18000MHz</b>											
7	14561.719	22.77	PK	39.7	-16.1	0.4	46.77	53.97	-7.2	74	-27.23
<b>Vertical 10000 - 18000MHz</b>											
8	13246.377	22.49	PK	39.1	-16.7	0.4	45.29	53.97	-8.68	74	-28.71
PK - Peak detector											
Av - Average detector											

## 8.2.2. ENHANCED DATA RATE 8PSK MODULATION

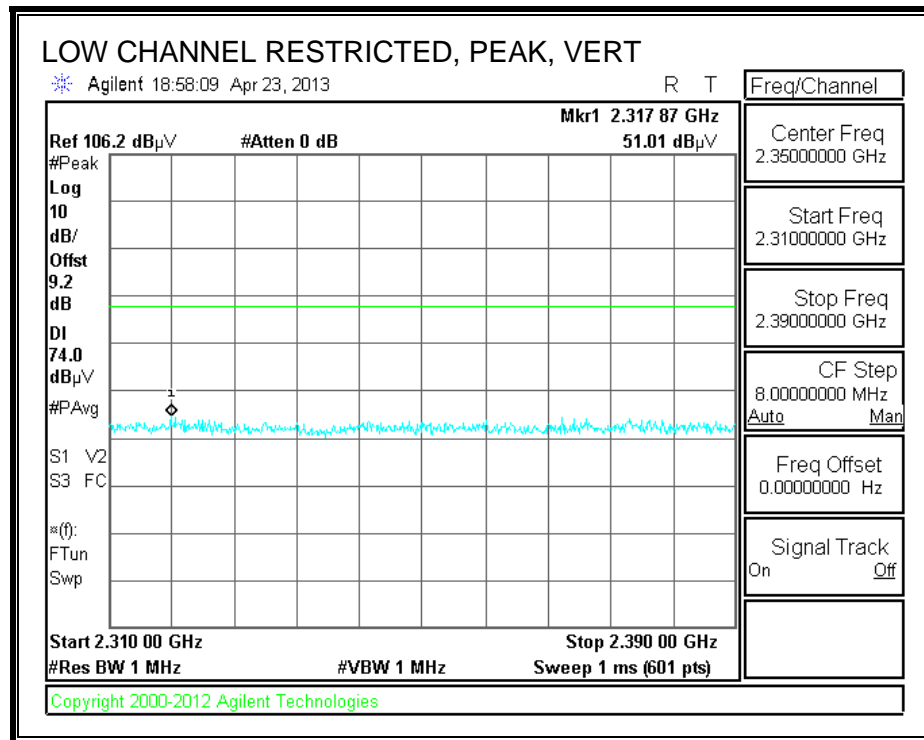
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

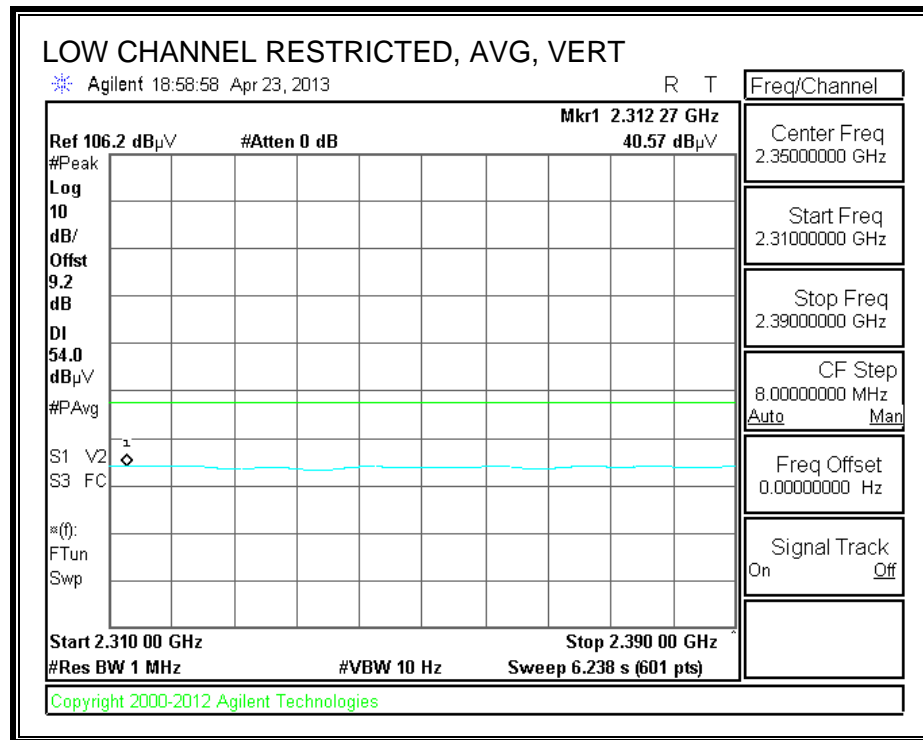




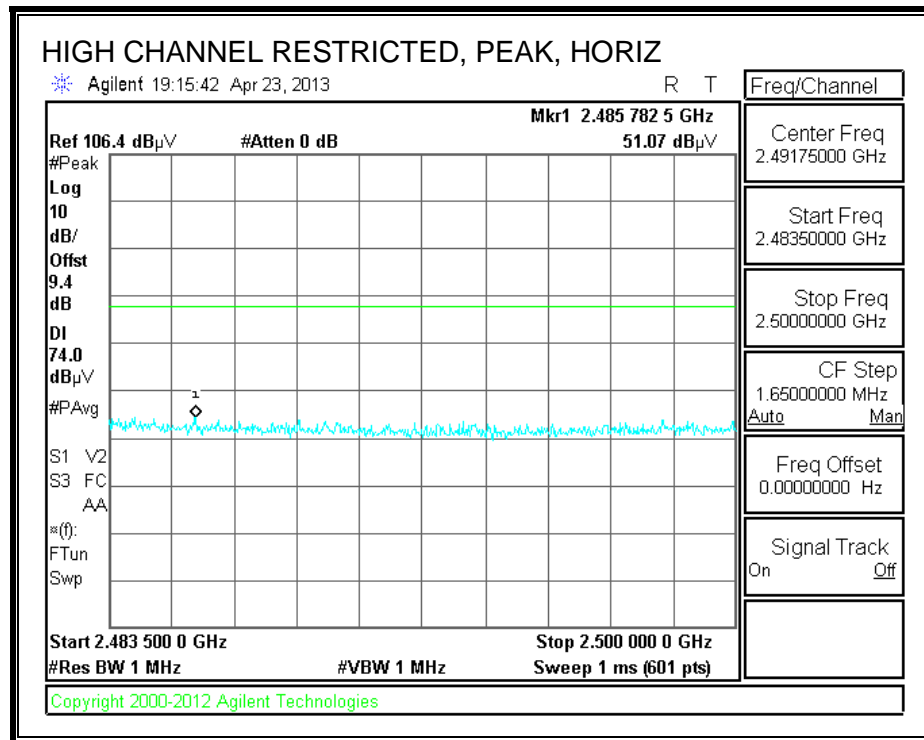


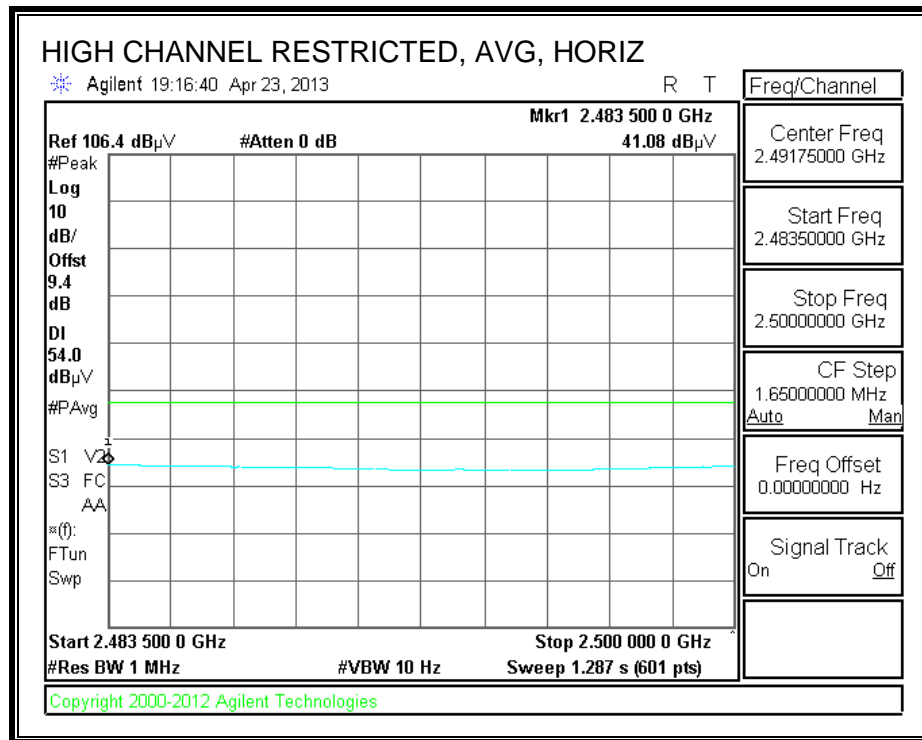
**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**



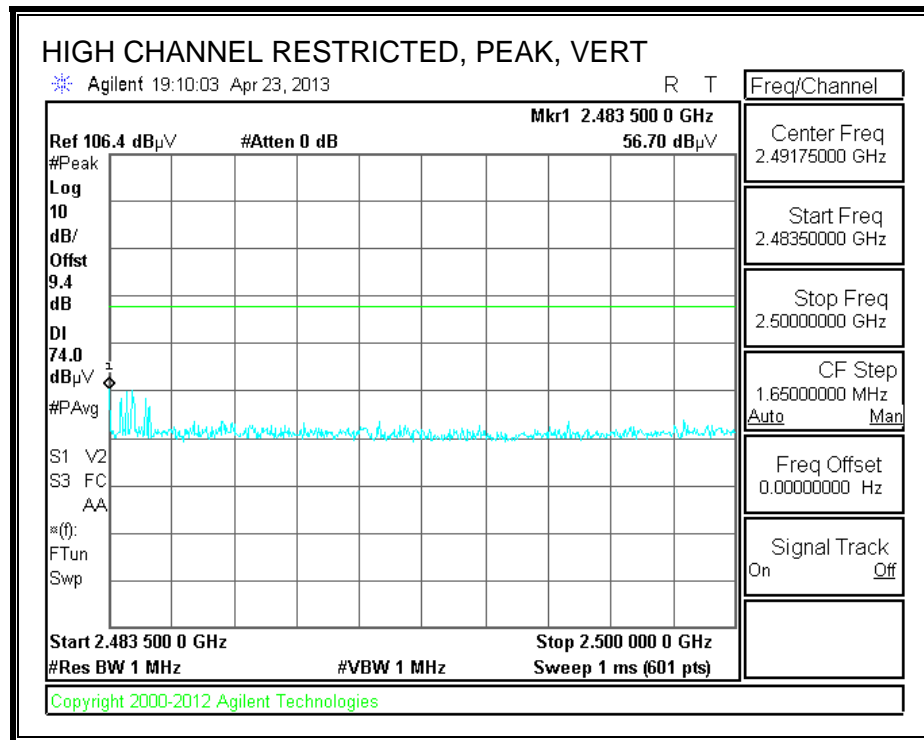


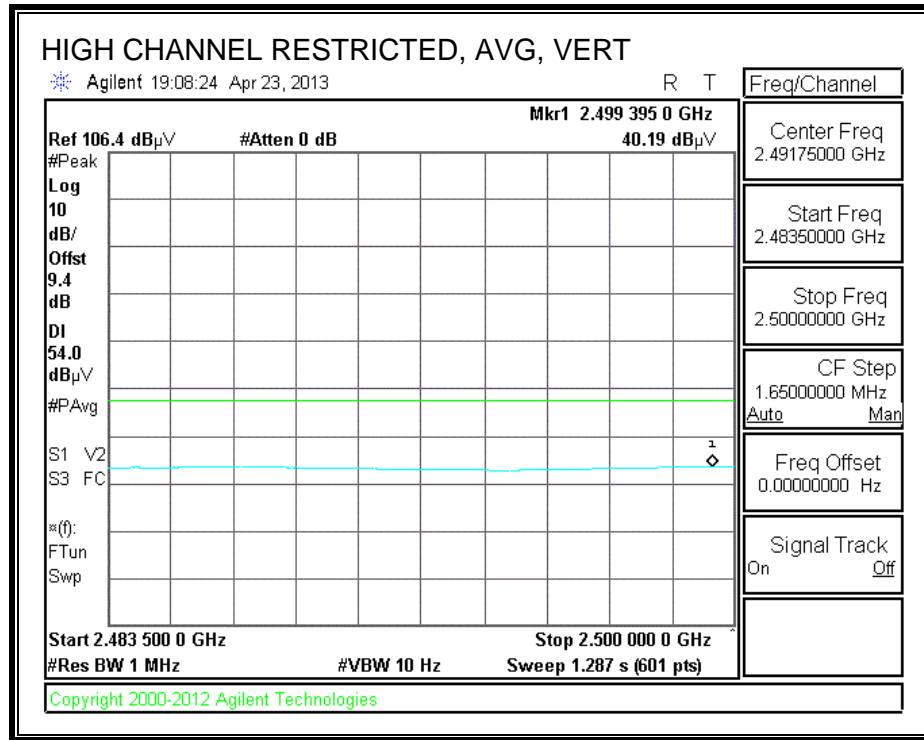
**RESTRICTED BANEDGE (HIGH CHANNEL, HORIZONTAL)**





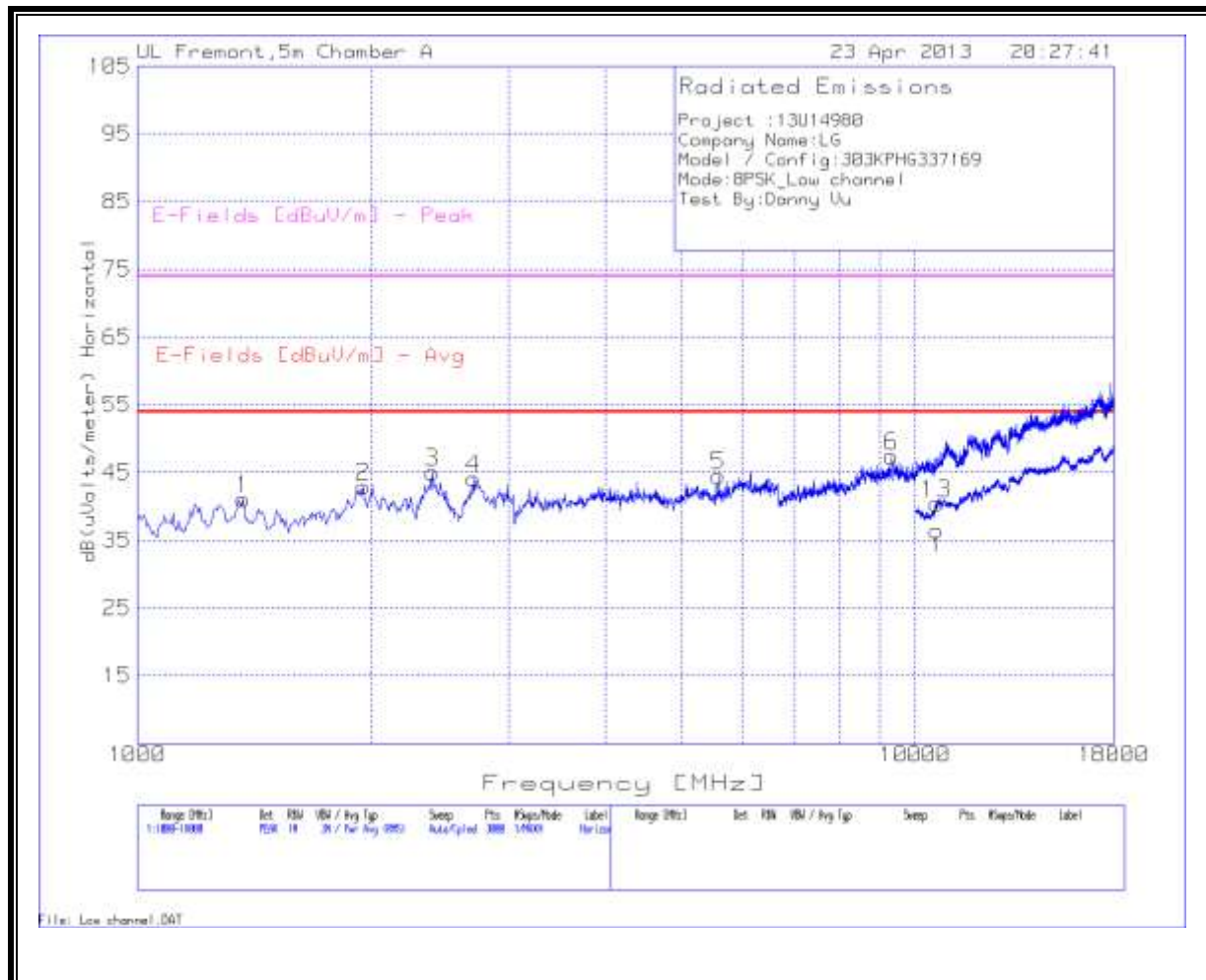
**RESTRICTED BANEDGE (HIGH CHANNEL, VERTICAL)**



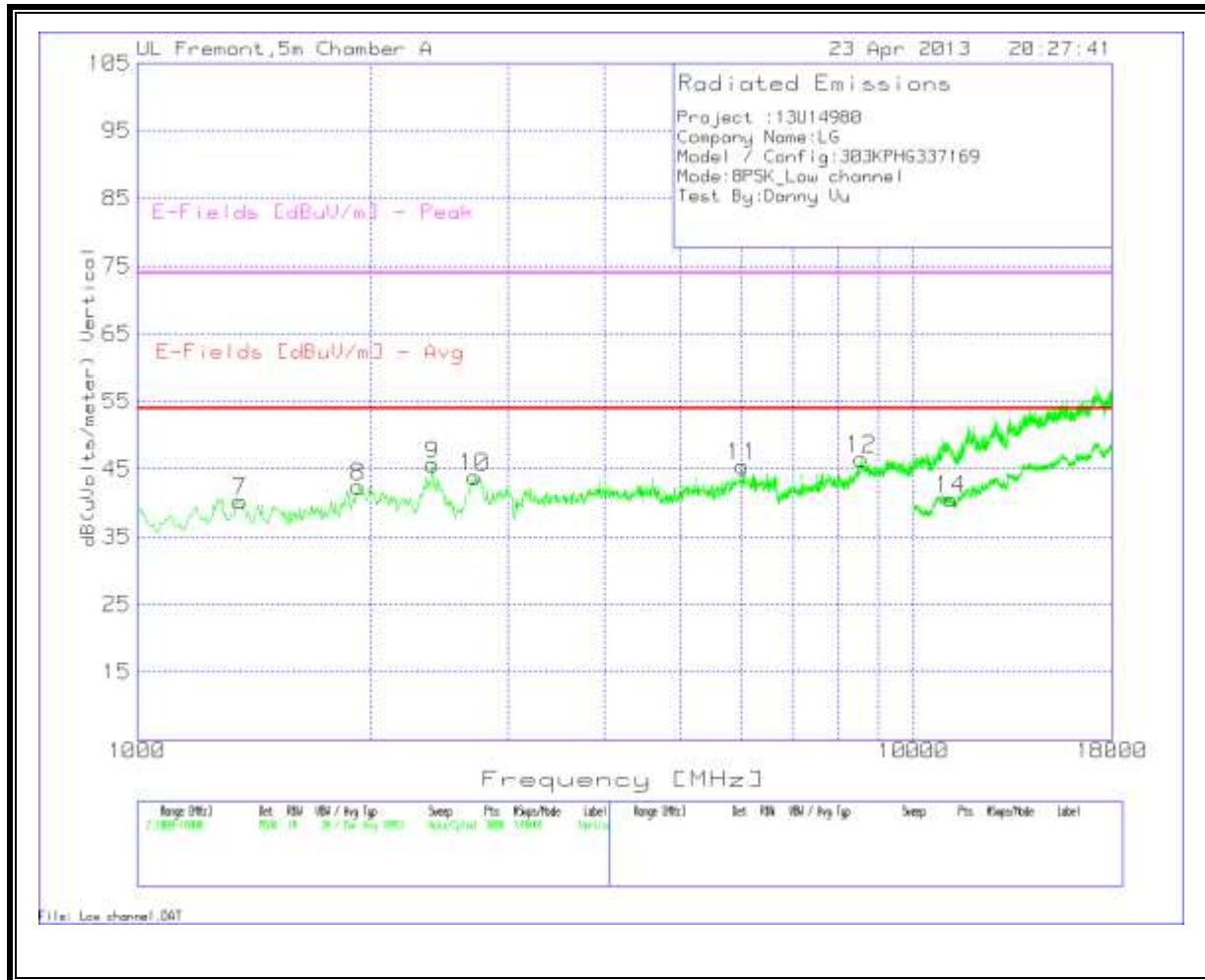


## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL HORIZONTAL

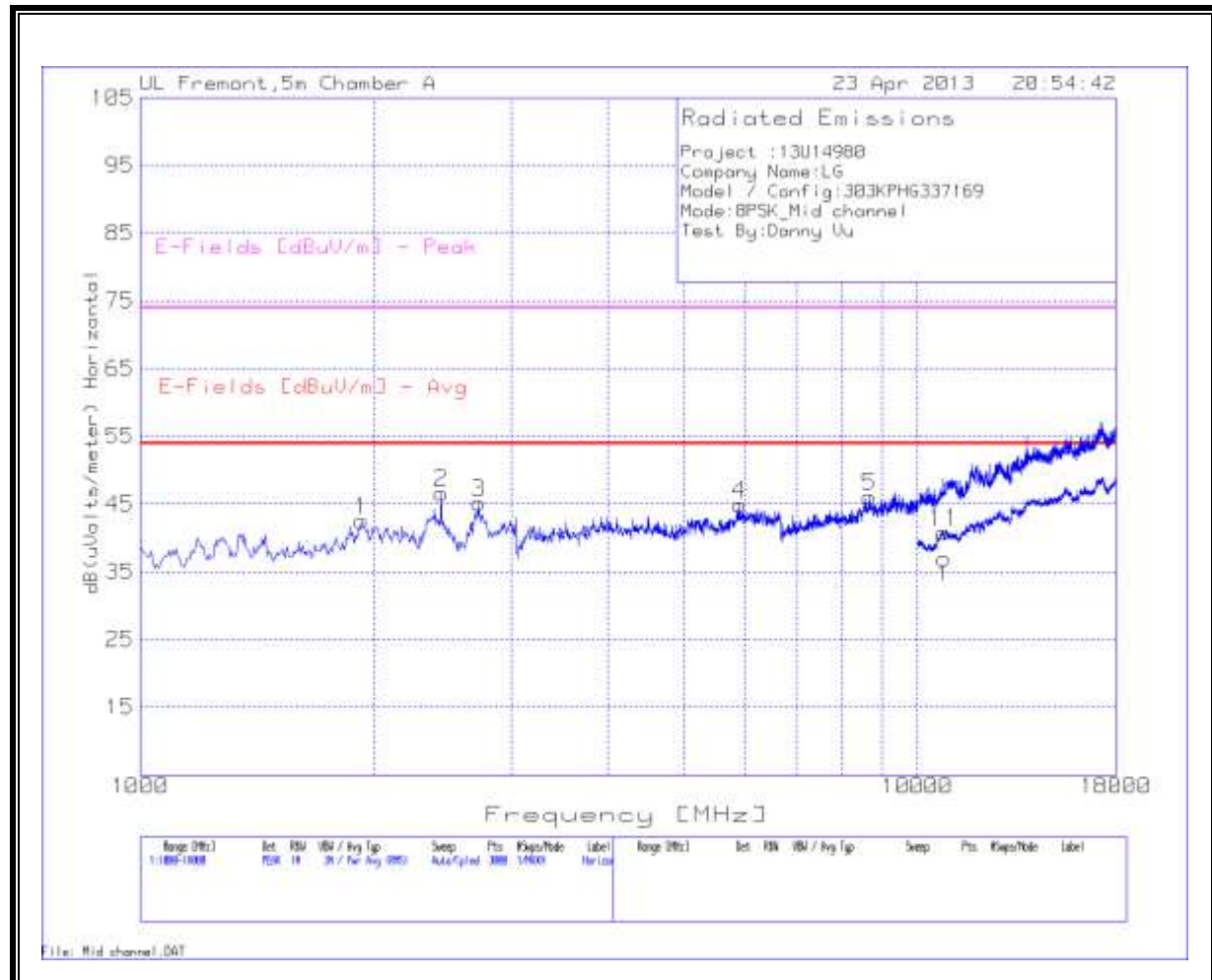


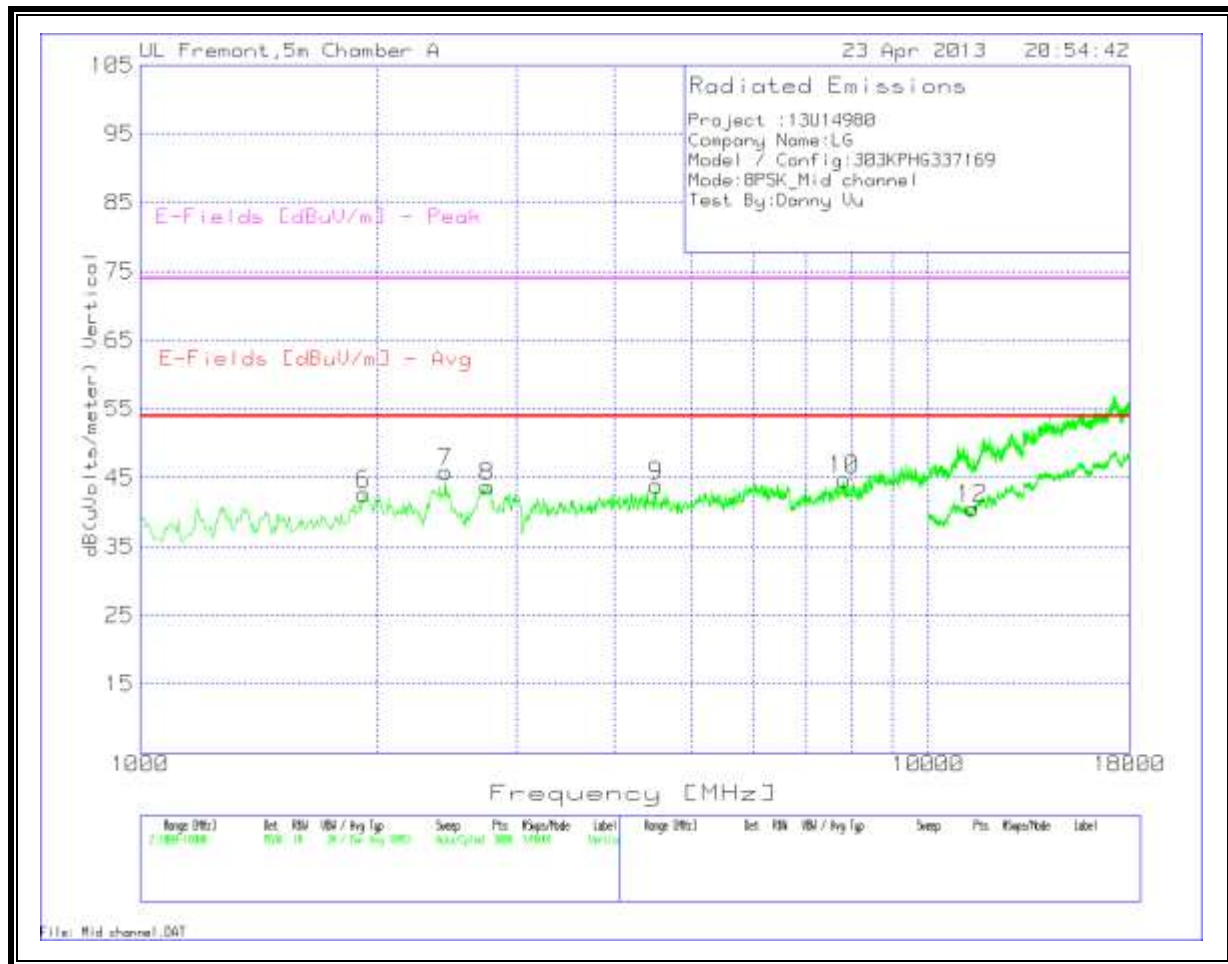




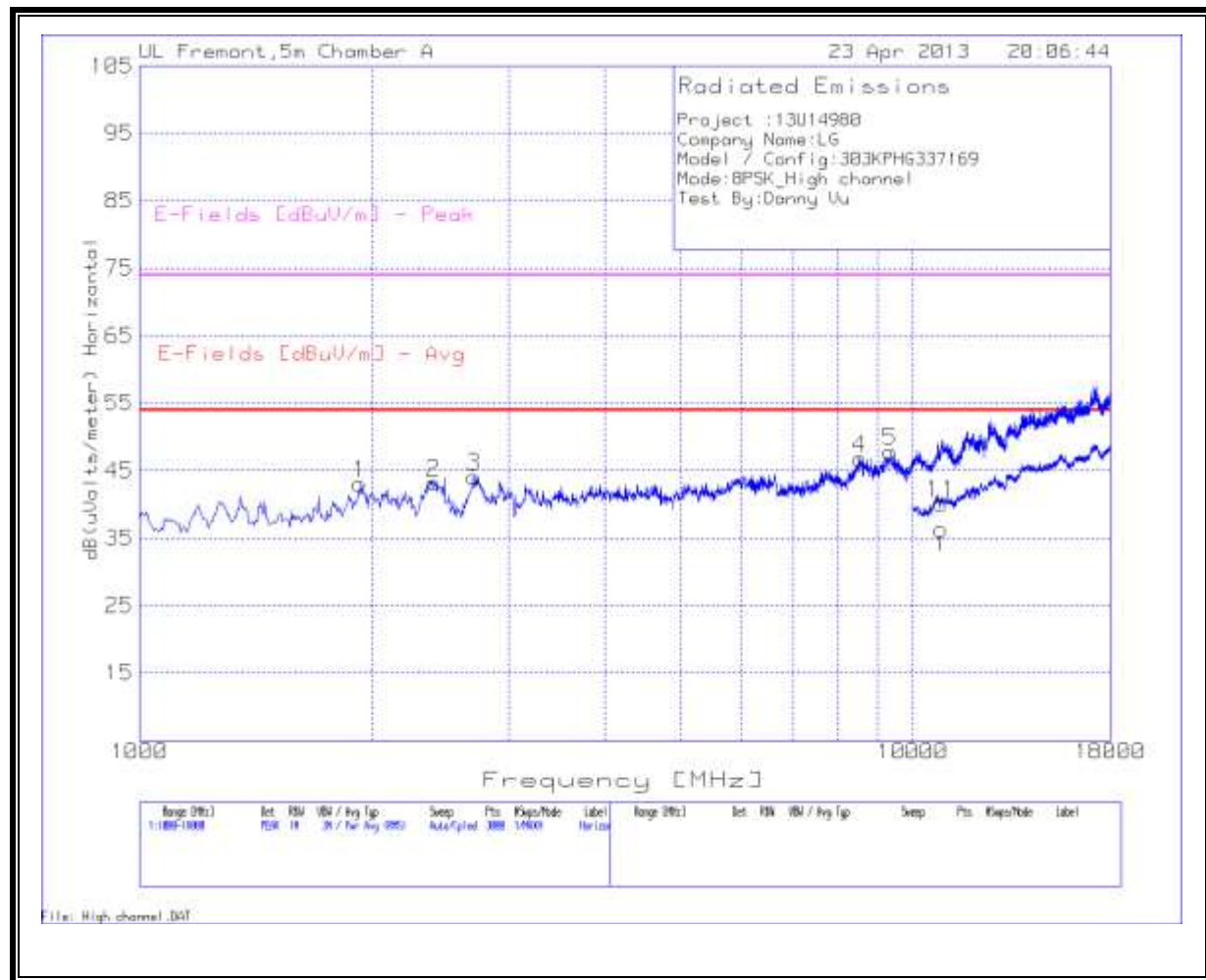
Project :13U14980														
Company Name:LG														
Model / Config:303KPHG337169														
Mode:8PSK_Low channel														
Test By:Danny Vu														
Marker No.	Test Frequency	Meter Reading	Detector	T136 Ant Factor [dB/m]	T144 Preamp Gain [dB]	Cable Factor [dB]	T160 BRF [dB]	dB(uV/m)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] - Peak	Margin (dB)	Height [cm]	Polarity
Horizontal 1000 - 18000MHz														
1	1368.088	45.24	PK	30	-38	3.4	0.4	41.04	53.97	-12.93	74	-32.96	200	Horz
2	1951.366	43.29	PK	31.8	-37.1	4	0.9	42.89	53.97	-11.08	74	-31.11	200	Horz
3	2398.734	44.57	PK	32.1	-36.9	4.4	0.9	45.07	53.97	-8.9	74	-28.93	200	Horz
4	2710.193	42.49	PK	32.7	-36.8	4.8	0.9	44.09	53.97	-9.88	74	-29.91	200	Horz
5	5581.279	38.05	PK	34.4	-35.5	7.4	0.2	44.55	53.97	-9.42	74	-29.45	200	Horz
6	9335.776	36.8	PK	36.3	-36.2	10	0.5	47.4	53.97	-6.57	74	-26.6	100	Horz
Vertical 1000 - 18000MHz														
7	1356.762	44.6	PK	30	-38.1	3.4	0.4	40.3	53.97	-13.67	74	-33.7	100	Vert
8	1928.714	42.86	PK	31.8	-37.2	4	0.9	42.36	53.97	-11.61	74	-31.64	100	Vert
9	2404.397	45.15	PK	32.1	-36.9	4.4	0.9	45.65	53.97	-8.32	74	-28.35	200	Vert
10	2721.519	42.29	PK	32.7	-36.8	4.8	0.9	43.89	53.97	-10.08	74	-30.11	200	Vert
11	6022.985	37.91	PK	35.2	-35.6	7.7	0.2	45.41	53.97	-8.56	74	-28.59	200	Vert
12	8576.949	36.91	PK	35.7	-36	9.5	0.4	46.51	53.97	-7.46	74	-27.49	200	Vert
Horizontal 10000 - 18000MHz														
13	10659.67	26.9	PK	37.9	-35.8	10.7	0.7	40.4	53.97	-13.57	74	-33.6	100	Horz
Vertical 10000 - 18000MHz														
14	11171.414	26.71	PK	37.9	-35.6	11	0.5	40.51	53.97	-13.46	74	-33.49	100	Vert
PK - Peak detector														
Av - Average detector														

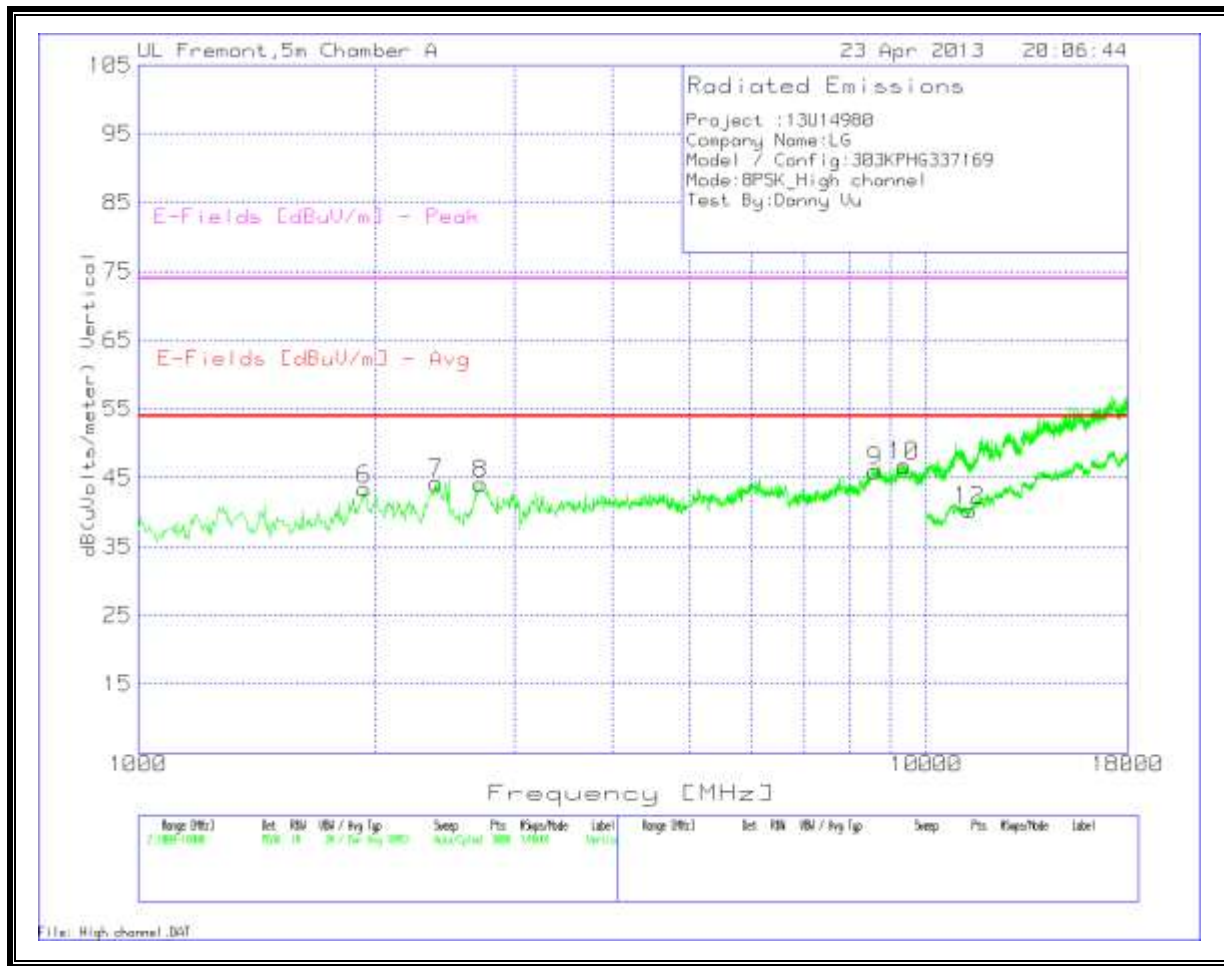
MID CHANNEL  
HORIZONTAL





Project :13U14980														
Company Name:LG														
Model / Config:303KPHG337169														
Mode:8PSK_Mid channel														
Test By:Danny Vu														
Marker No.	Test Frequency	Meter Reading	Detector	T136 Ant Factor [dB/m]	T144 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
<b>Horizontal 1000 - 18000MHz</b>														
1	1928.714	42.99	PK	31.8	-37.2	4	0.9	42.49	53.97	-11.48	74	-31.51	100	Horz
2	2438.374	45.85	PK	32.3	-36.9	4.5	0.9	46.65	53.97	-7.32	74	-27.35	200	Horz
3	2727.182	43.55	PK	32.7	-36.8	4.8	0.9	45.15	53.97	-8.82	74	-28.85	100	Horz
4	5909.727	37.58	PK	35.1	-35.6	7.6	0.2	44.88	53.97	-9.09	74	-29.12	100	Horz
5	8690.207	36.3	PK	35.8	-36	9.6	0.4	46.1	53.97	-7.87	74	-27.9	200	Horz
<b>Vertical 1000 - 18000MHz</b>														
6	1923.051	43.32	PK	31.7	-37.2	3.9	0.9	42.62	53.97	-11.35	74	-31.38	100	Vert
7	2438.374	45.03	PK	32.3	-36.9	4.5	0.9	45.83	53.97	-8.14	74	-28.17	200	Vert
8	2761.159	42.2	PK	32.6	-36.8	4.8	0.9	43.7	53.97	-10.27	74	-30.3	200	Vert
9	4516.656	39.19	PK	33.8	-35.8	6.5	0.2	43.89	53.97	-10.08	74	-30.11	200	Vert
10	7829.447	35.94	PK	35.5	-35.9	9	0.2	44.74	53.97	-9.23	74	-29.26	200	Vert
<b>Horizontal 10000 - 18000MHz</b>														
11	10811.594	27.17	PK	38	-35.7	10.8	0.6	40.87	53.97	-13.1	74	-33.13	200	Horz
<b>Vertical 10000 - 18000MHz</b>														
12	11395.302	26.22	PK	38.2	-35.6	11.1	0.6	40.52	53.97	-13.45	74	-33.48	100	Vert
PK - Peak detector														
Av - Average detector														







Project :13U14980

Company Name:LG

Model / Config:303KPHG337169

Mode:8PSK\_High channel

Test By:Danny Vu

Marker No.	Test Frequency	Meter Reading	Detector	T136 Ant Factor [dB/m]	T144 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
<b>Horizontal 1000 - 18000MHz</b>														
1	1928.714	43.53	PK	31.8	-37.2	4	0.9	43.03	53.97	-10.94	74	-30.97	200	Horz
2	2404.397	42.72	PK	32.1	-36.9	4.4	0.9	43.22	53.97	-10.75	74	-30.78	200	Horz
3	2704.53	42.59	PK	32.7	-36.8	4.7	0.9	44.09	53.97	-9.88	74	-29.91	200	Horz
4	8542.971	37.16	PK	35.7	-36	9.5	0.4	46.76	53.97	-7.21	74	-27.24	200	Horz
5	9347.102	37.18	PK	36.3	-36.2	10	0.5	47.78	53.97	-6.19	74	-26.22	138	Horz
<b>Vertical 1000 - 18000MHz</b>														
6	1940.04	43.89	PK	31.8	-37.2	4	0.9	43.39	53.97	-10.58	74	-30.61	200	Vert
7	2387.408	43.83	PK	32	-36.9	4.4	0.9	44.23	53.97	-9.74	74	-29.77	200	Vert
8	2721.519	42.51	PK	32.7	-36.8	4.8	0.9	44.11	53.97	-9.86	74	-29.89	100	Vert
9	8605.263	36.33	PK	35.7	-36	9.6	0.4	46.03	53.97	-7.94	74	-27.97	200	Vert
10	9369.753	36.12	PK	36.4	-36.2	10	0.4	46.72	53.97	-7.25	74	-27.28	100	Vert
<b>Horizontal 10000 - 18000MHz</b>														
11	10867.566	26.61	PK	37.9	-35.7	10.8	0.6	40.21	53.97	-13.76	74	-33.79	100	Horz
<b>Vertical 10000 - 18000MHz</b>														
12	11347.326	26.04	PK	38.1	-35.6	11.1	0.7	40.34	53.97	-13.63	74	-33.66	100	Vert

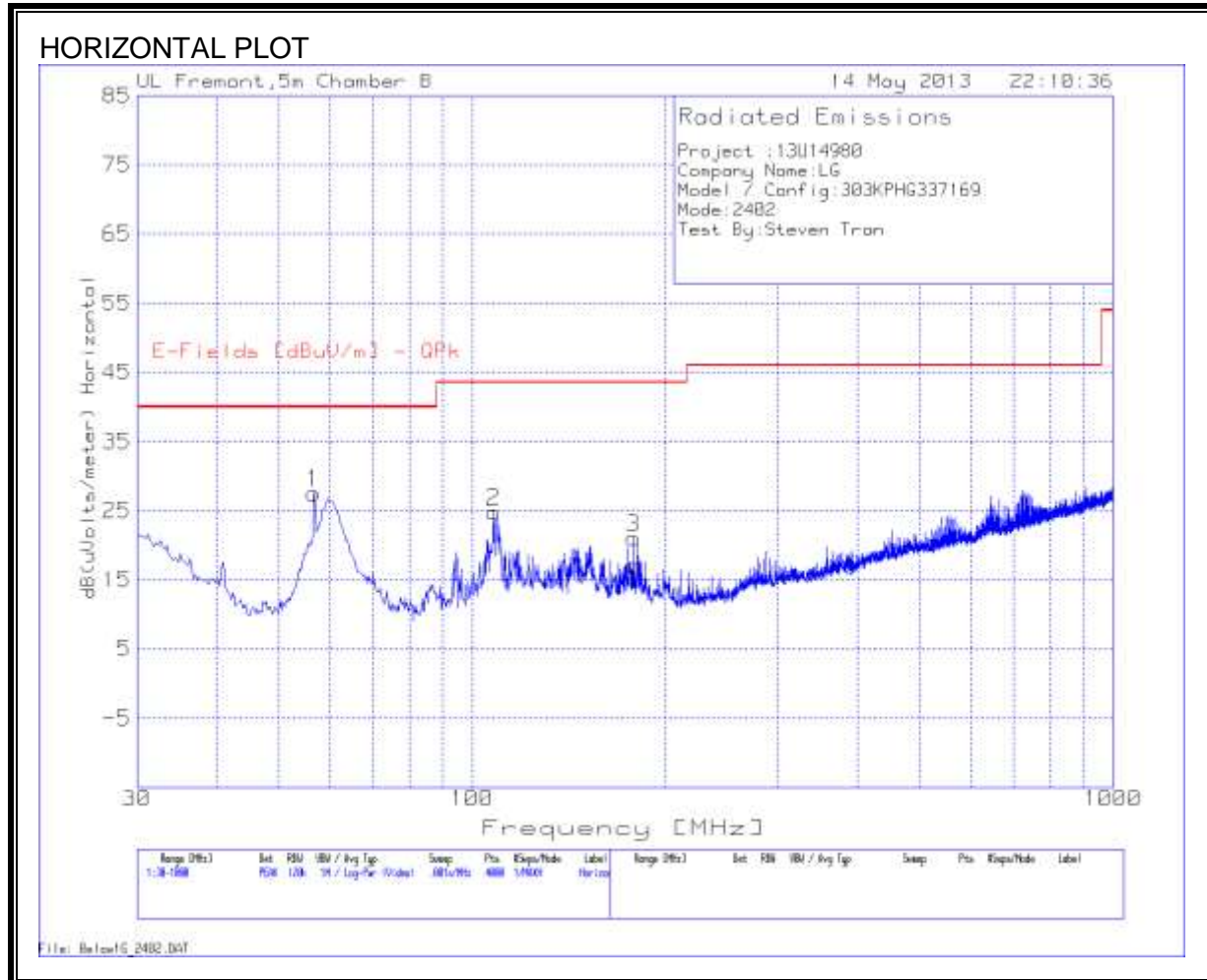
PK - Peak detector

Av - Average detector



### 8.3. WORST-CASE BELOW 1 GHz

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



## HORIZONTAL DATA

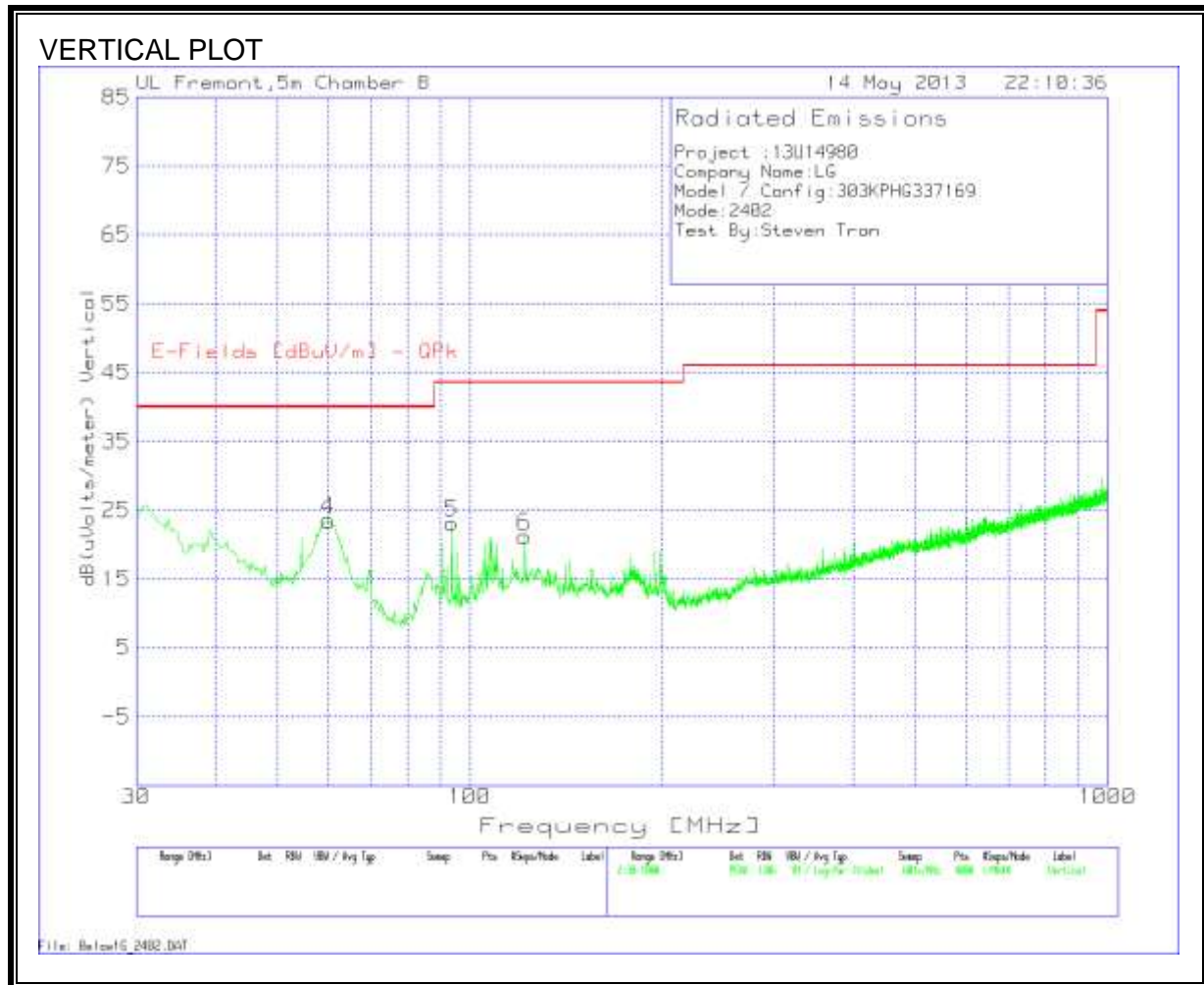
Project :13U14980										
Company Name:LG										
Model / Config:303KPHG337169										
Mode:2402										
Test By:Steven Tran										

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
<b>Horizontal 30 - 1000MHz</b>										
1	56.655	49.47	PK	6.9	-28.8	27.57	40	-12.43	400	Horz
2	108.0265	40.9	PK	12.2	-28.3	24.8	43.52	-18.72	200	Horz
3	179.0257	37.6	PK	11	-27.5	21.1	43.52	-22.42	200	Horz

PK - Peak detector

Av - Average detector

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



VERTICAL DATA

Project :13U14980										
Company Name:LG										
Model / Config:303KPHG337169										
Mode:2402										
Test By:Steven Tran										
Marker No.	Test Frequency	Meter Reading	Detector	T243 Antenna Factor dB/m	T10 preamp/ Cable loss [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] - QPk	Margin (dB)	Height [cm]	Polarity
Vertical 30 - 1000MHz										
4	60.0475	45.18	PK	7.1	-28.8	23.48	40	-16.52	300	Vert
5	93.7297	43.17	PK	8.3	-28.4	23.07	43.52	-20.45	200	Vert
6	121.8386	35.33	PK	14	-28.1	21.23	43.52	-22.29	200	Vert
PK - Peak detector										
Av - Average detector										

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

<sup>\*</sup> Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

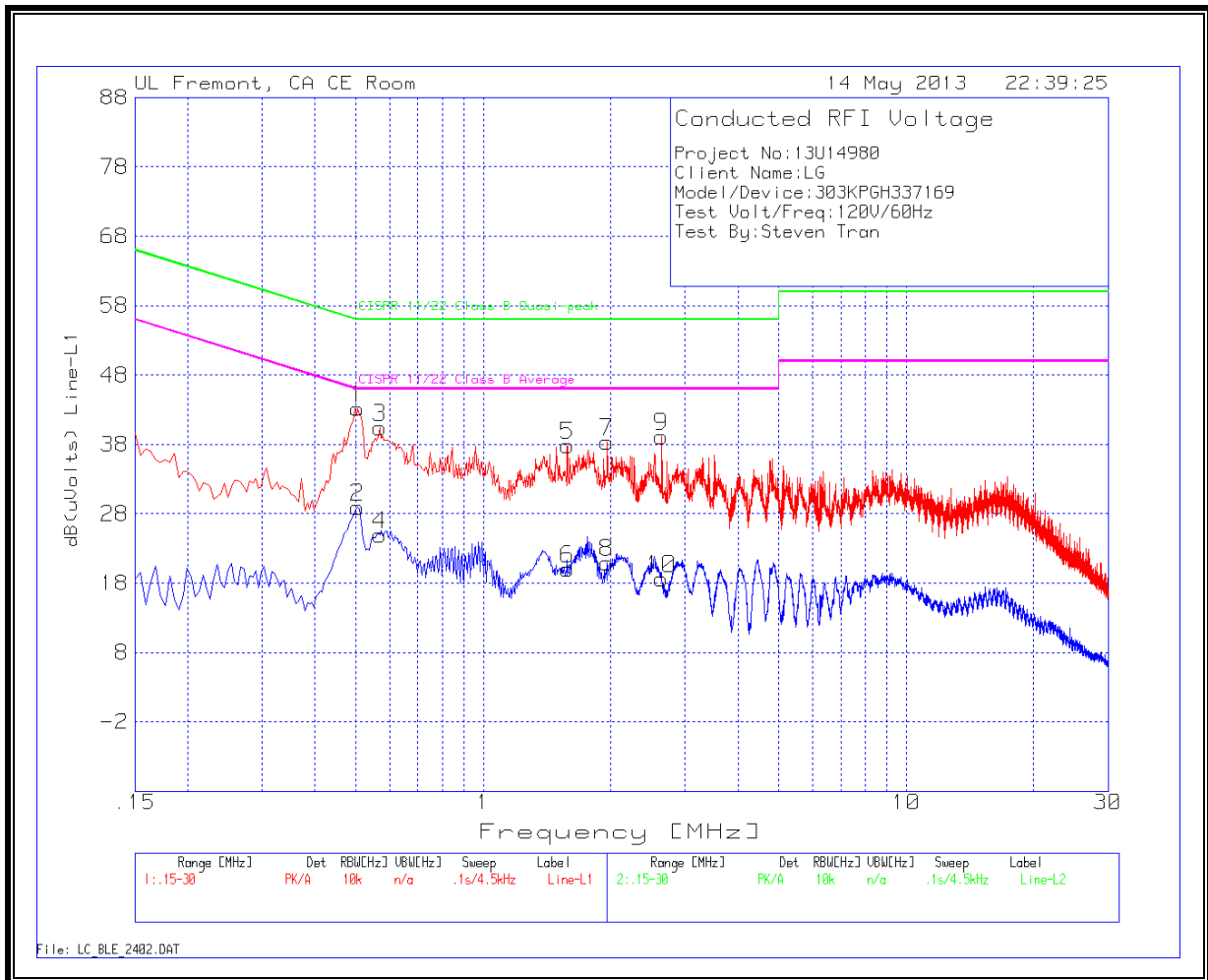
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

# 6 WORST EMISSIONS

Project No:13U14980									
Client Name:LG									
Model/Device:303KPGH337169									
Test Volt/Freq:120V/60Hz									
Test By:Steven Tran									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
Line-L1 .15 - 30MHz									
0.5055	43.09	PK	0.1	0	43.19	56	-12.81	-	-
0.5055	28.81	Av	0.1	0	28.91	-	-	46	-17.09
0.5685	40.28	PK	0.1	0	40.38	56	-15.62	-	-
0.5685	24.81	Av	0.1	0	24.91	-	-	46	-21.09
1.581	37.67	PK	0.1	0.1	37.87	56	-18.13	-	-
1.581	19.81	Av	0.1	0.1	20.01	-	-	46	-25.99
1.9635	38.12	PK	0.1	0.1	38.32	56	-17.68	-	-
1.9635	20.8	Av	0.1	0.1	21	-	-	46	-25
2.643	38.97	PK	0.1	0.1	39.17	56	-16.83	-	-
2.643	18.49	Av	0.1	0.1	18.69	-	-	46	-27.31
Test Frequency	Meter Reading	Detector	T24 IL L2.TXT (dB)	LC Cables 2&3.TXT (dB)	dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin	CISPR 11/22 Class B Average	Margin
Line-L2 .15 - 30MHz									
0.51	38.77	PK	0.1	0	38.87	56	-17.13	-	-
0.51	25.88	Av	0.1	0	25.98	-	-	46	-20.02
0.6315	37.46	PK	0.1	0	37.56	56	-18.44	-	-
0.6315	19.75	Av	0.1	0	19.85	-	-	46	-26.15
0.8025	36.39	PK	0.1	0	36.49	56	-19.51	-	-
0.8025	17.39	Av	0.1	0	17.49	-	-	46	-28.51
1.41	34.51	PK	0.1	0	34.61	56	-21.39	-	-
1.41	16.13	Av	0.1	0	16.23	-	-	46	-29.77
1.707	35.22	PK	0.1	0.1	35.42	56	-20.58	-	-
1.707	17.63	Av	0.1	0.1	17.83	-	-	46	-28.17
PK - Peak detector									
Av - Average detector									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

