



**FCC CFR47 PART 15 SUBPART C**

**BLUETOOTH LOW ENERGY  
CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+**

**MODEL NUMBER: SCV32**

**FCC ID: A3LSCV32**

**REPORT NUMBER: 15I21858-E3V2**

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*Prepared for*

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Date	Revisions	Revised By
--	11/11/15	Initial Issue	P. Zhang
V2	11/13/15	Updated Section 5.1 and 5.3	C. Vergonio

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+  
**MODEL:** SCV32  
**SERIAL NUMBER:** 2138045 (Conducted), 2140998 (Radiated)  
**DATE TESTED:** JUNE 8 -18, 2015

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.

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LAB ENGINEER  
UL VERIFICATION SERVICES INC

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013 for FCC, FCC CFR 47 Part 2 and FCC CFR 47 Part 15

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
<input checked="" type="checkbox"/> Chamber A(IC: 2324B-1)	<input type="checkbox"/> Chamber D(IC: 2324B-4)
<input type="checkbox"/> Chamber B(IC: 2324B-2)	<input type="checkbox"/> Chamber E(IC: 2324B-5)
<input type="checkbox"/> Chamber C(IC: 2324B-3)	<input type="checkbox"/> Chamber F(IC: 2324B-6)
	<input type="checkbox"/> Chamber G(IC: 2324B-7)
	<input type="checkbox"/> Chamber H(IC: 2324B-8)

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

## 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:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

### 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 GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, NFC and ANT+.

The model FCC ID: A3LSCV32 shares the same enclosure and circuit board as model FCC ID: A3LSMA800S. The DTS & Bluetooth circuitry and layout, including antenna, are almost identical between the two units. The DTS & Bluetooth antenna and surrounding circuitry is the same between these two units.

After confirming through preliminary radiated emissions that the performance of the A3LSCV32 DTS & Bluetooth data remains representative of this model (FCC ID: A3LSMA800S). Test data for FCC ID: A3LSMA800S is being submitted for this application.

## 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	BLE	7.53	5.66

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -3.02 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 X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	N/A	N/A	N/A
Earphone	Samsung	N/A	N/A	N/A

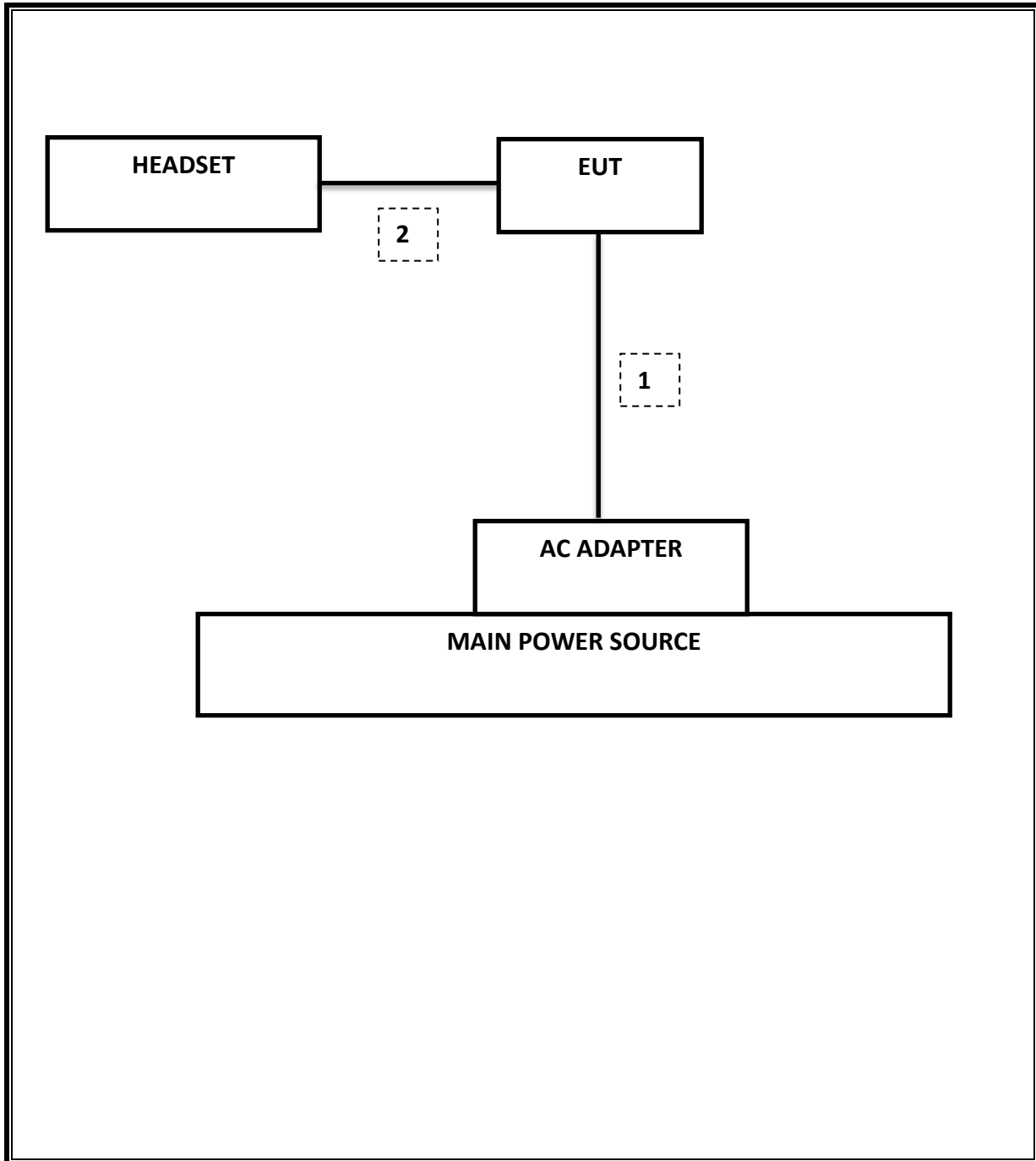
### I/O CABLES

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

EUT was set in the Hidden menu mode to enable BLE 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
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
Spectrum Analyzer, 9KHz-40GHz	HP	8564E	C00986	04/01/16
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/13/16
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/16
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/16
Antenna, Horn, 18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/15
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/16
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/16
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/16
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/16
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	T404	06/29/16
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/16
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/16
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/16
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/16
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012	
CLT Software	UL	UL RF	Ver 1.0, Feb 2 2015	
Antenna Port Software	UL	UL RF	Ver 2.1.1.1, Jan 20 2015	

## 7. SUMMARY

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass	0.708 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-44.9 dBm
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass	7.53 dBm
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass	-11.39 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass	50.22dBuV(AV)
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass	43.76dBuV/m

## ANTENNA PORT TEST RESULTS

### 8.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

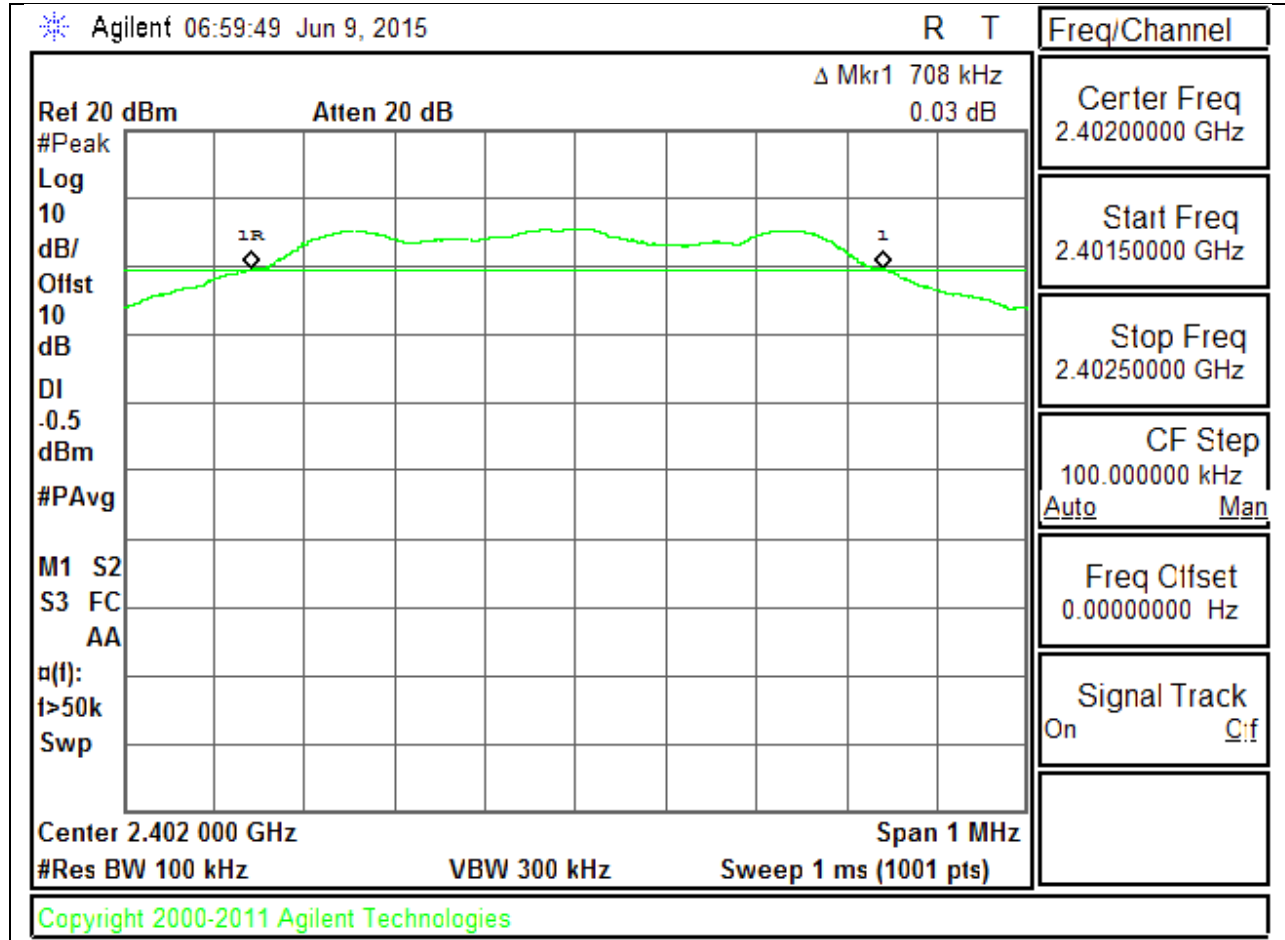
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

#### RESULTS

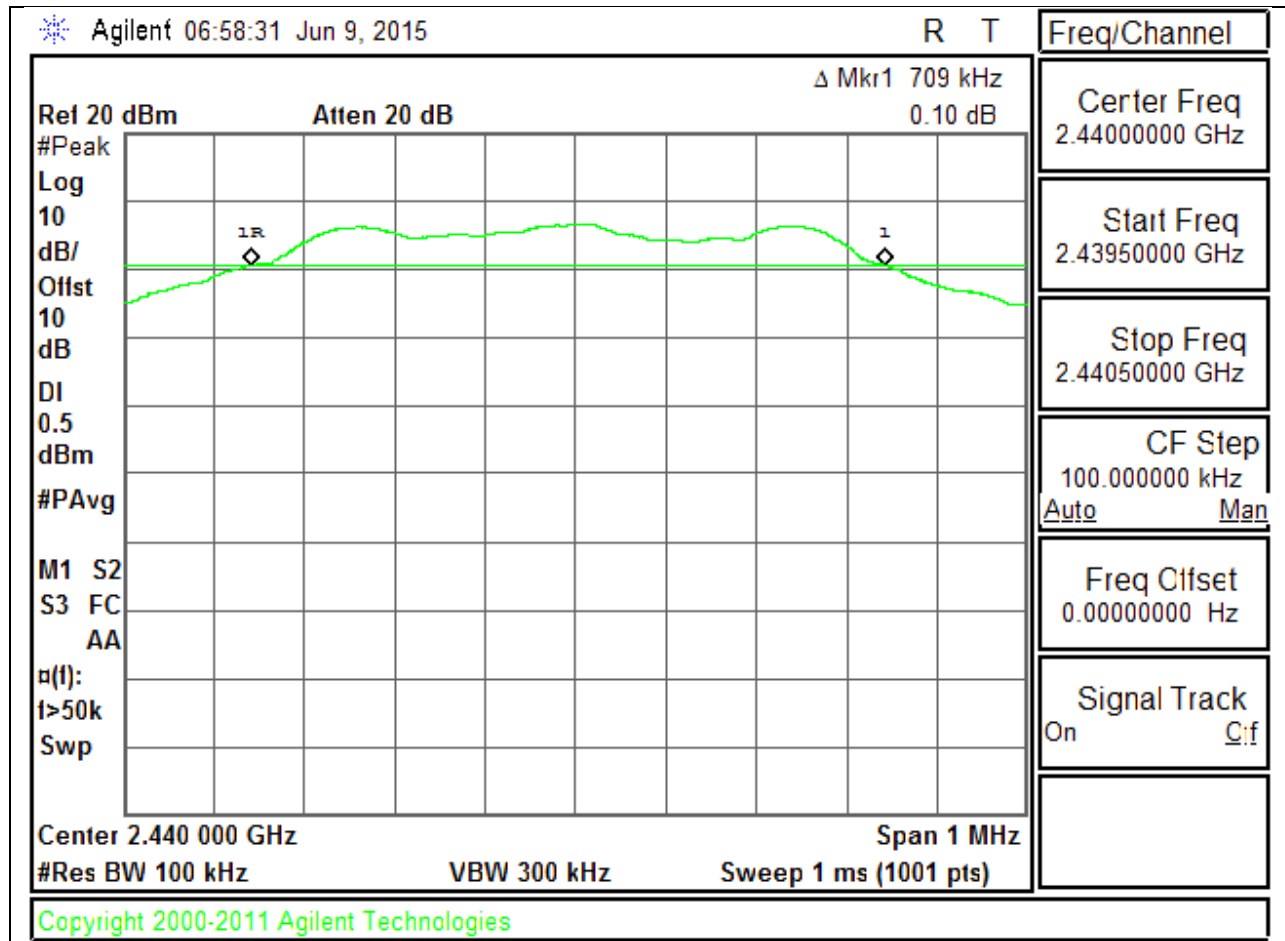
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.708	0.5
Middle	2440	0.709	0.5
High	2480	0.713	0.5

**6 dB BANDWIDTH PLOTS**

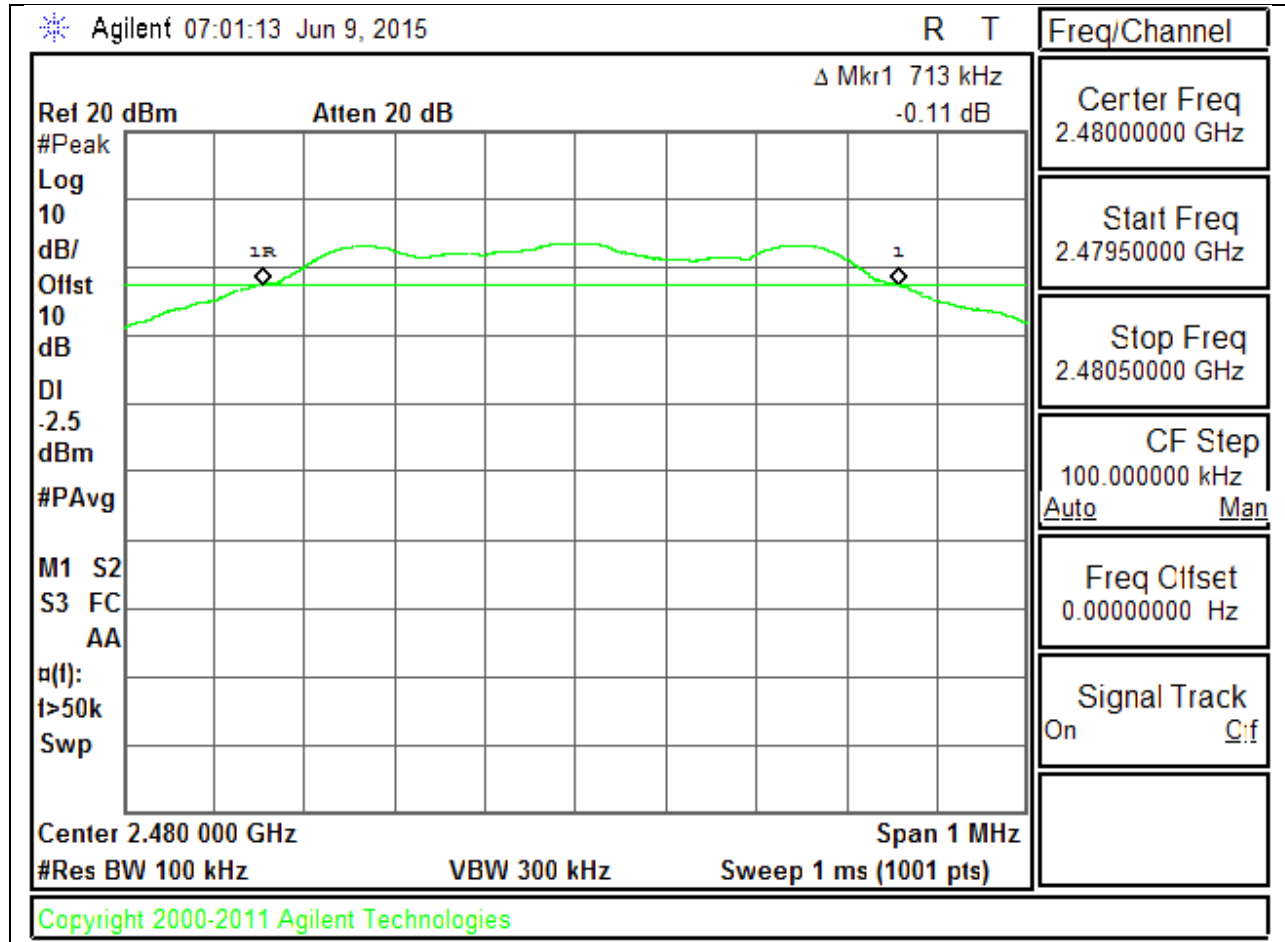
**LOW CHANNEL**



### MID CHANNEL



### HIGH CHANNEL



## 8.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

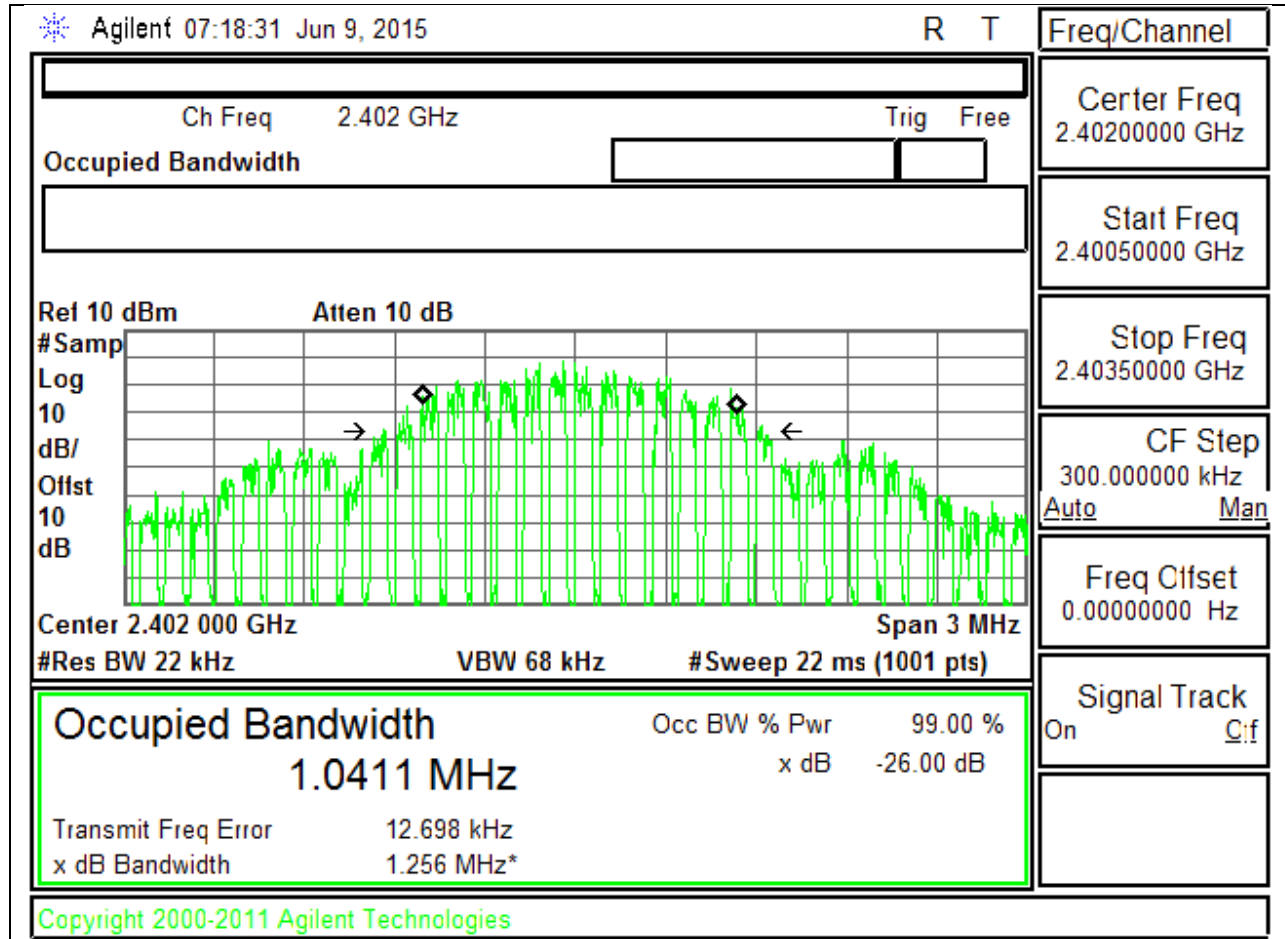
Reference to KDB558074 D01 DTS Meas Guidance v03r03 The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

### RESULTS

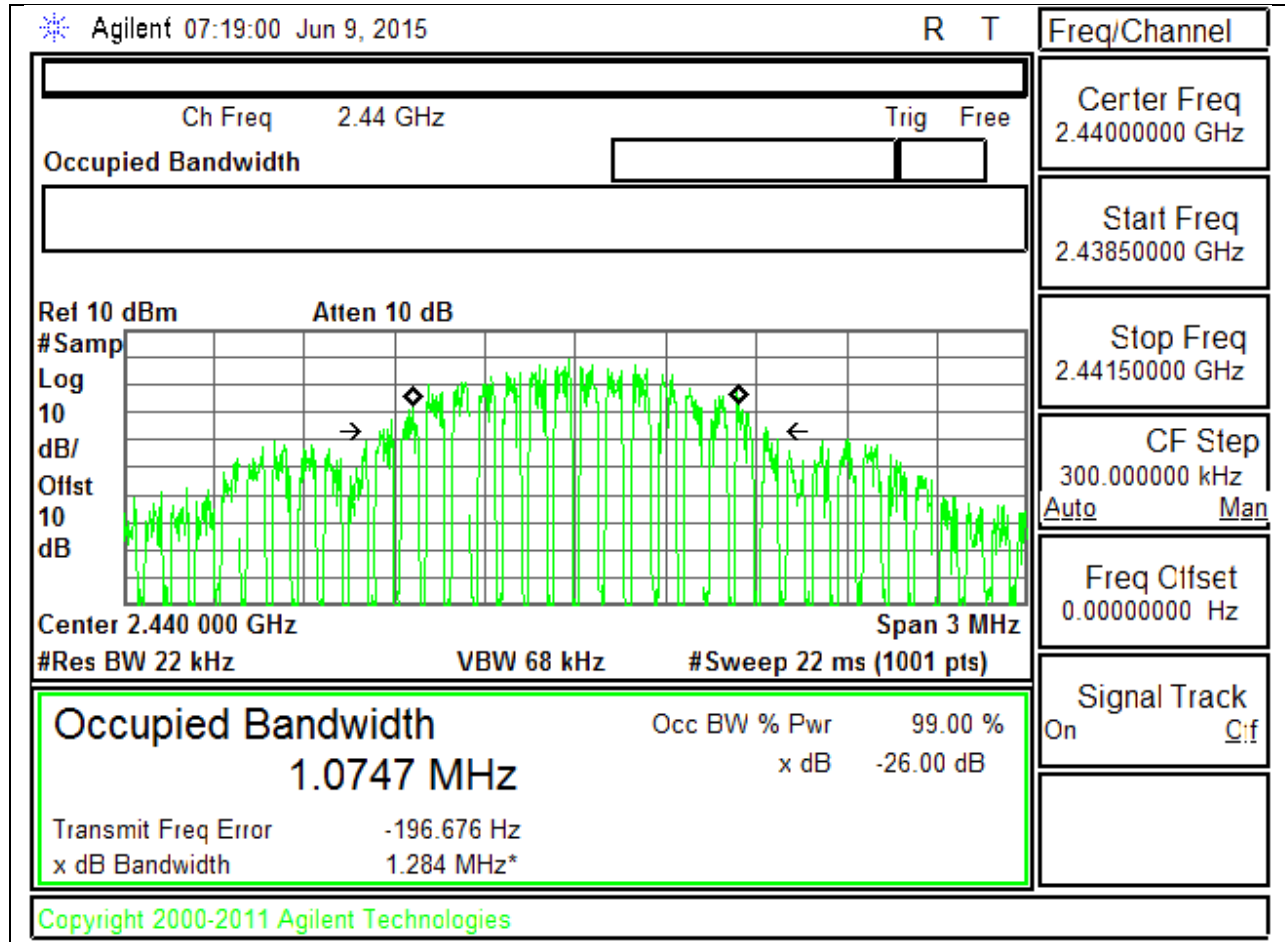
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0411
Middle	2440	1.0747
High	2480	1.0745

**99% BANDWIDTH PLOTS**

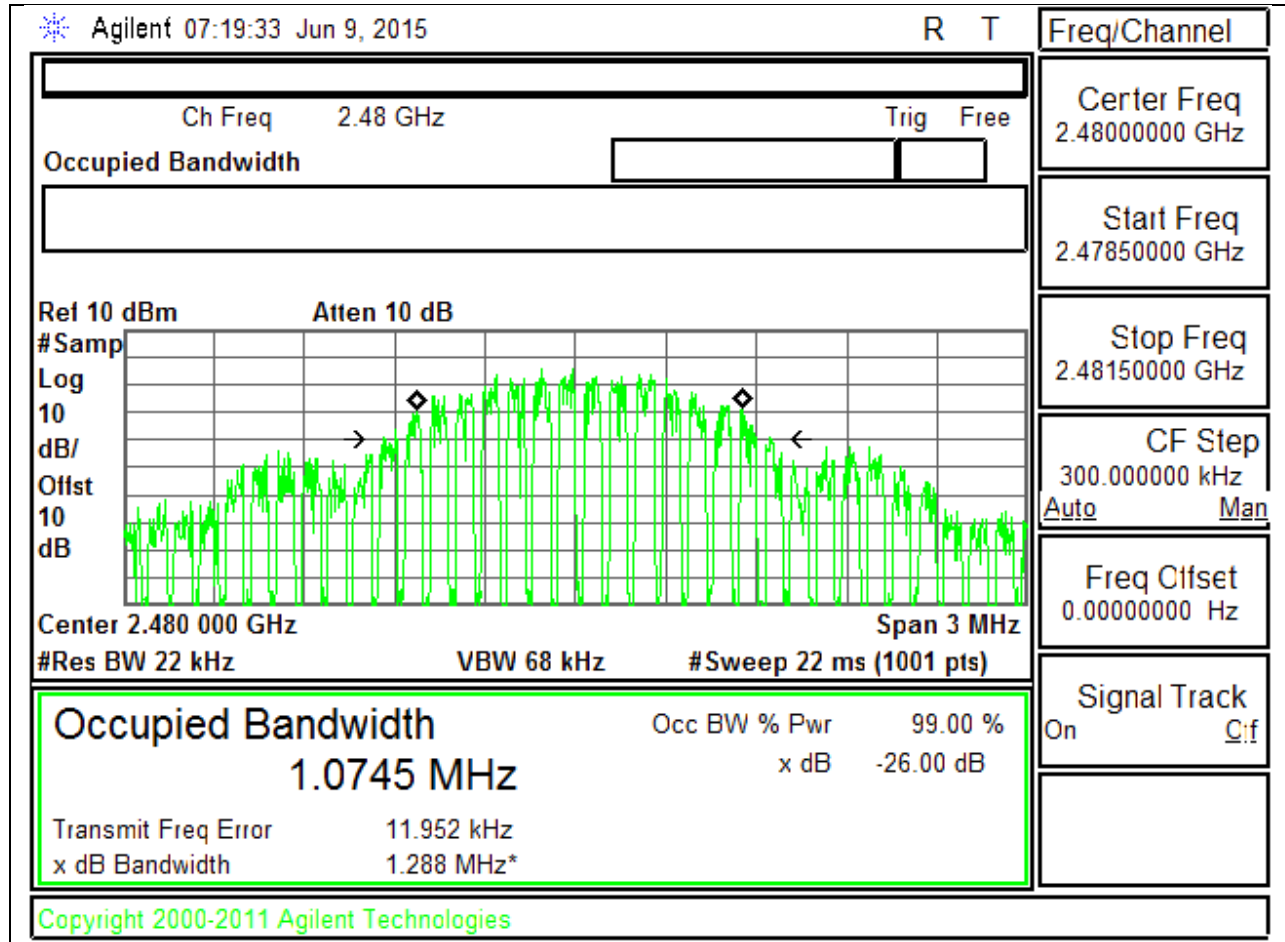
**LOW CHANNEL**



**MID CHANNEL**



### HIGH CHANNEL



### 8.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

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

#### TEST PROCEDURE

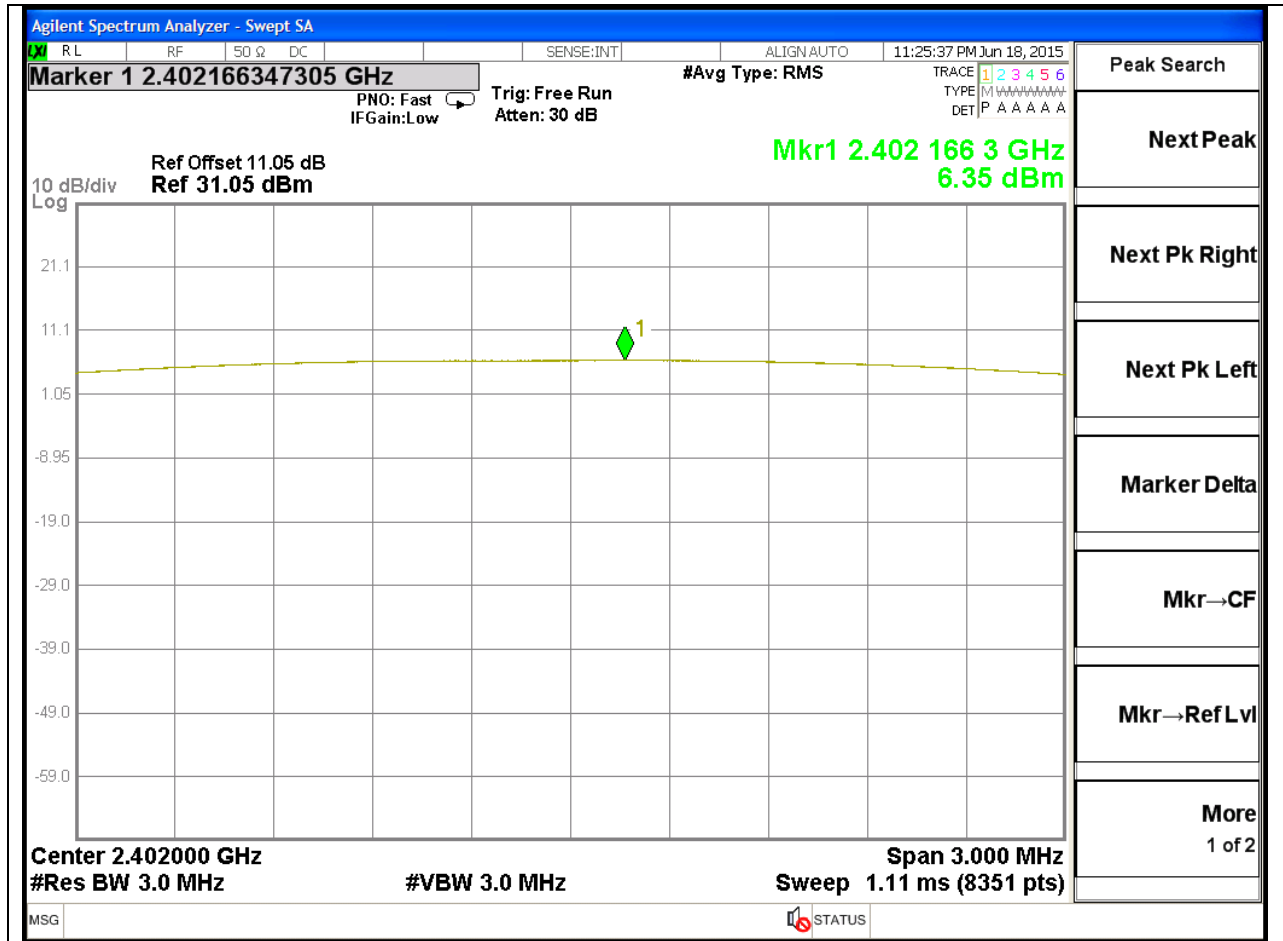
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r03 utilizing spectrum analyzer.

#### RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.35	30	-23.650
Middle	2440	7.53	30	-22.470
High	2480	5.38	30	-24.620

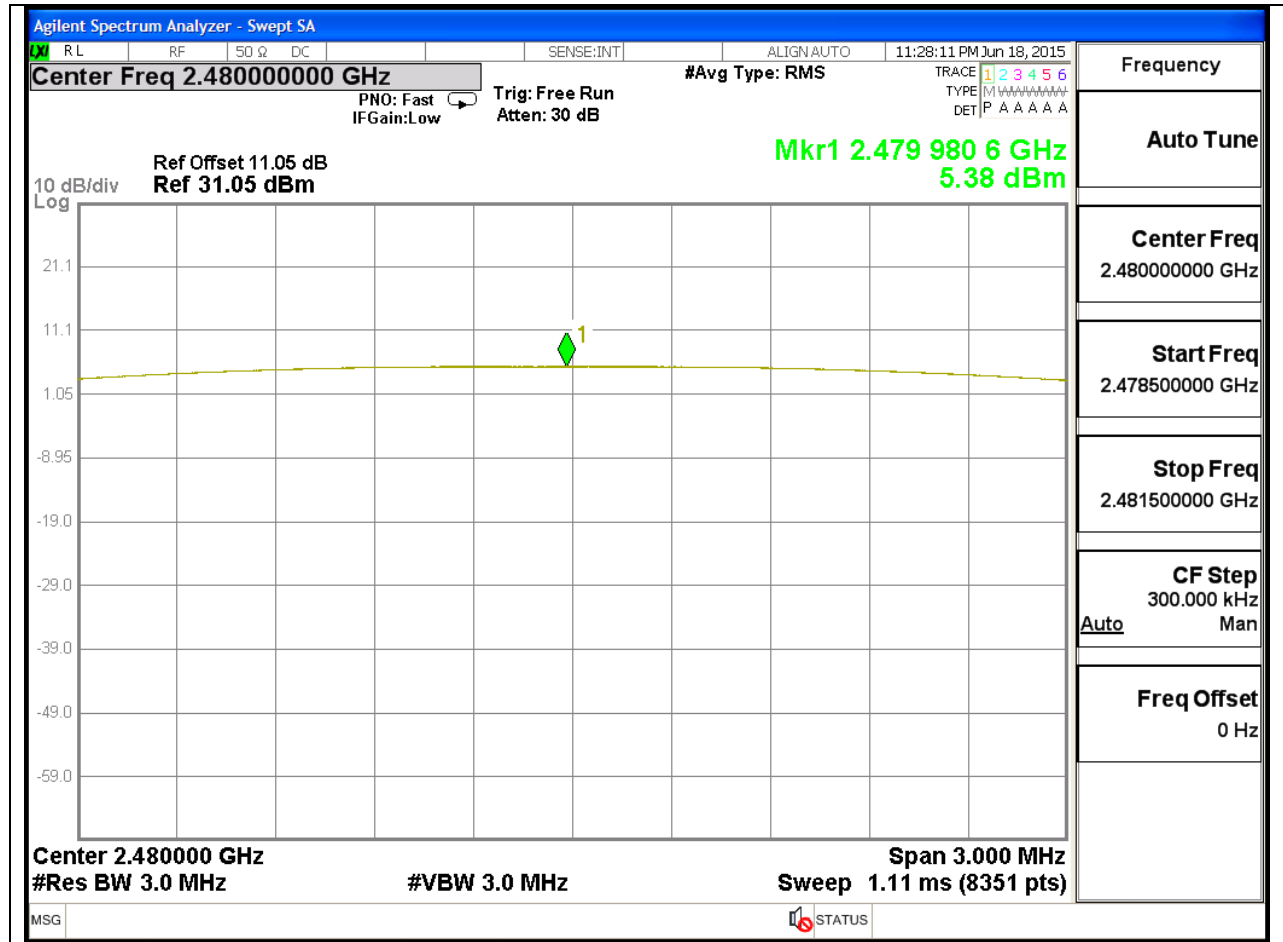
**OUTPUT POWER PLOTS**

**LOW CHANNEL**





### HIGH CHANNEL



## 8.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	6.3
Middle	2440	7.4
High	2480	5.3

## 8.5. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST PROCEDURE

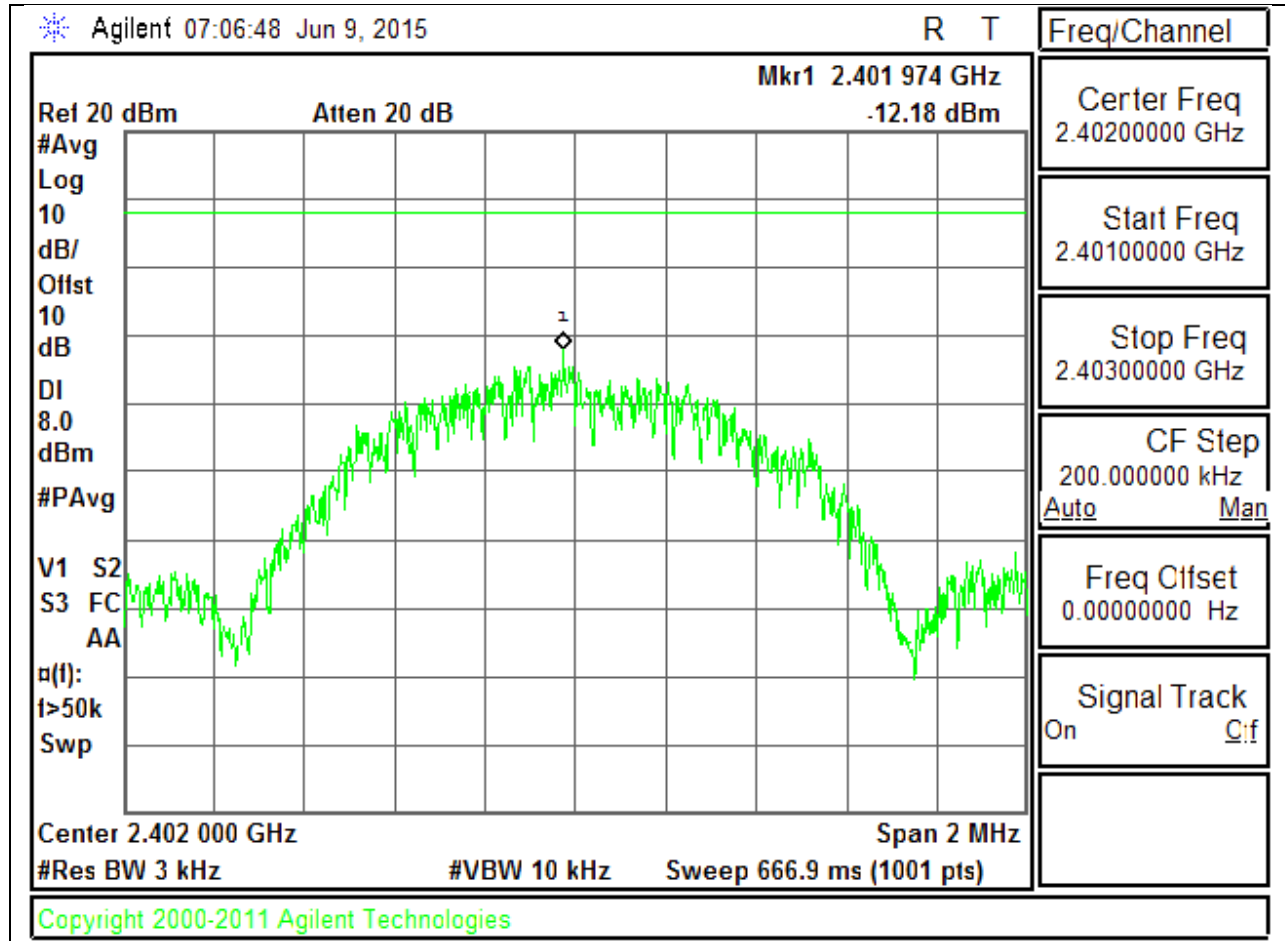
Power Spectral Density was performed utilizing the “Method PKPSD (Peak PSD)” under KDB558074 D01 DTS Meas Guidance v03r03

### RESULTS

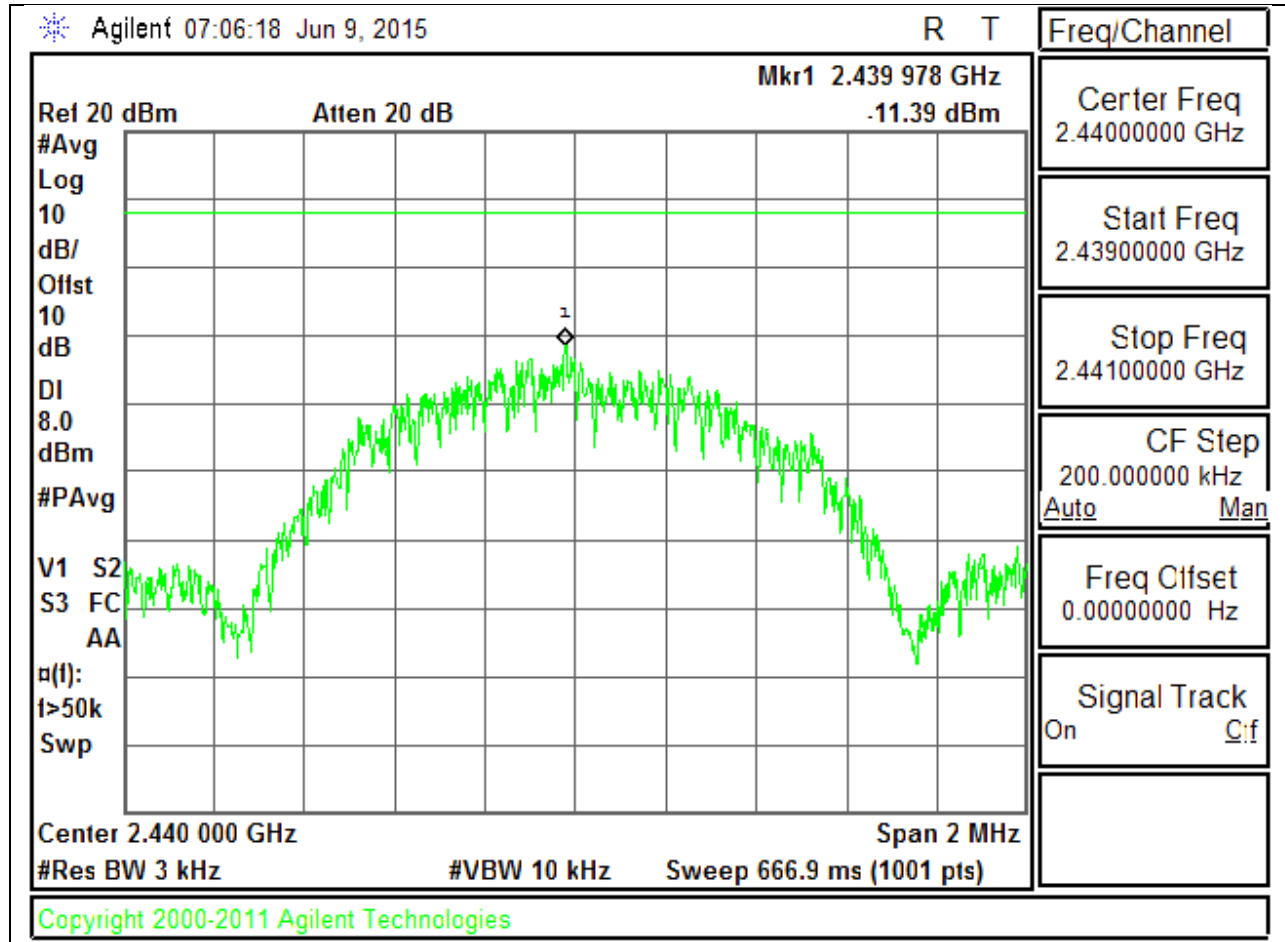
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-12.18	8	-20.18
Middle	2440	-11.39	8	-19.39
High	2480	-14.04	8	-22.04

**POWER SPECTRAL DENSITY PLOTS**

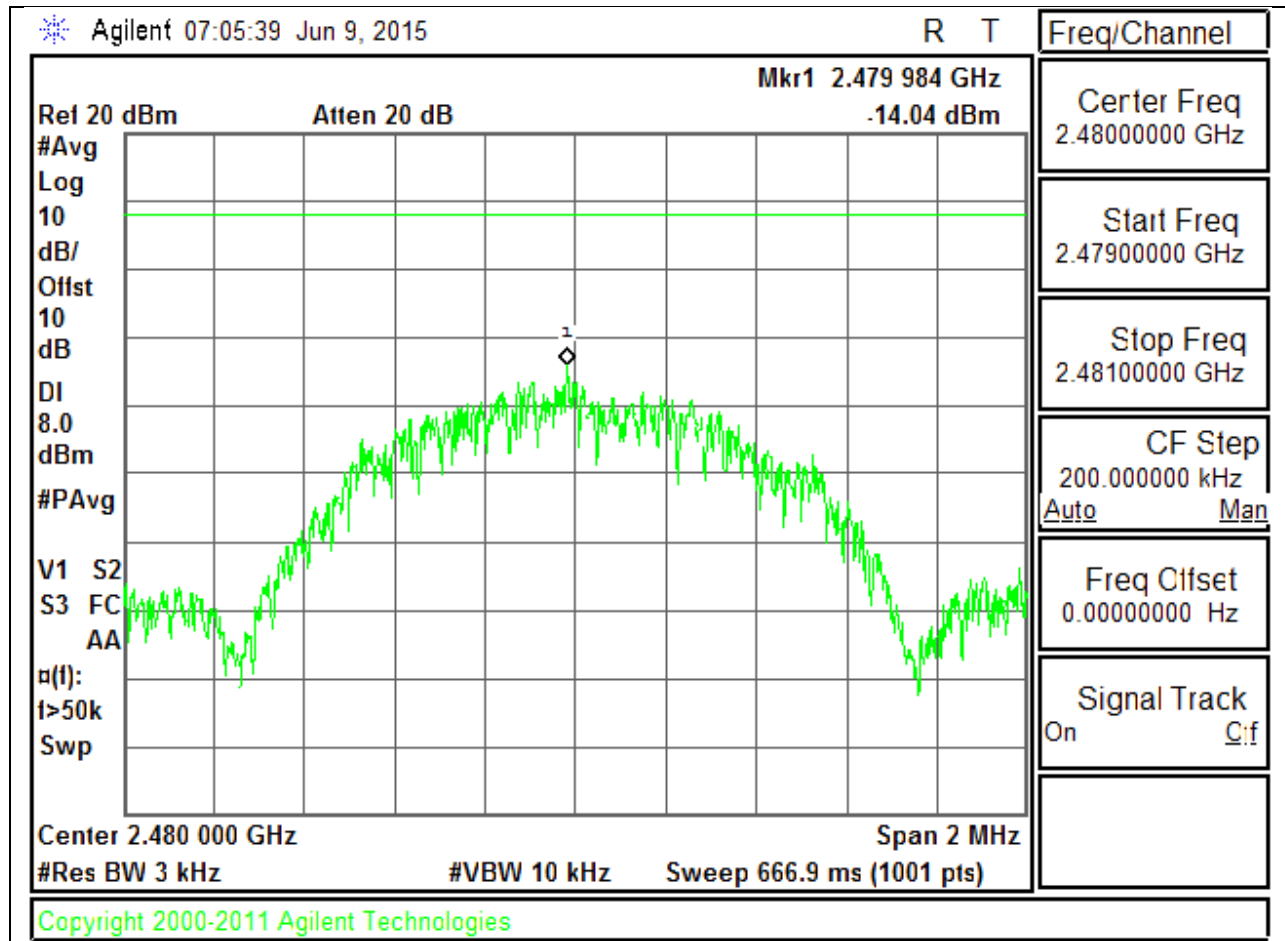
**LOW CHANNEL**



**MID CHANNEL**



### HIGH CHANNEL



## **8.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### **TEST PROCEDURE**

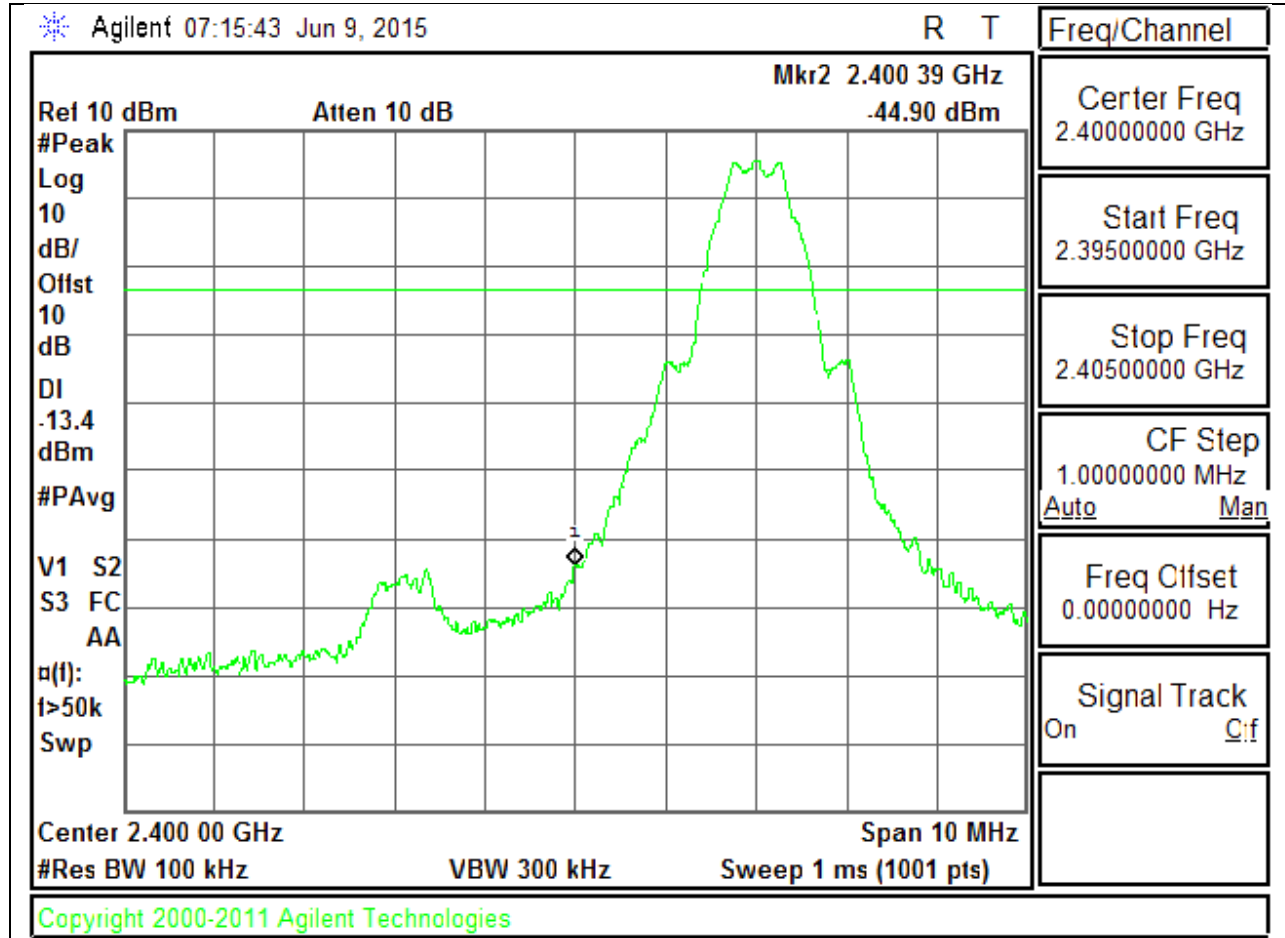
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

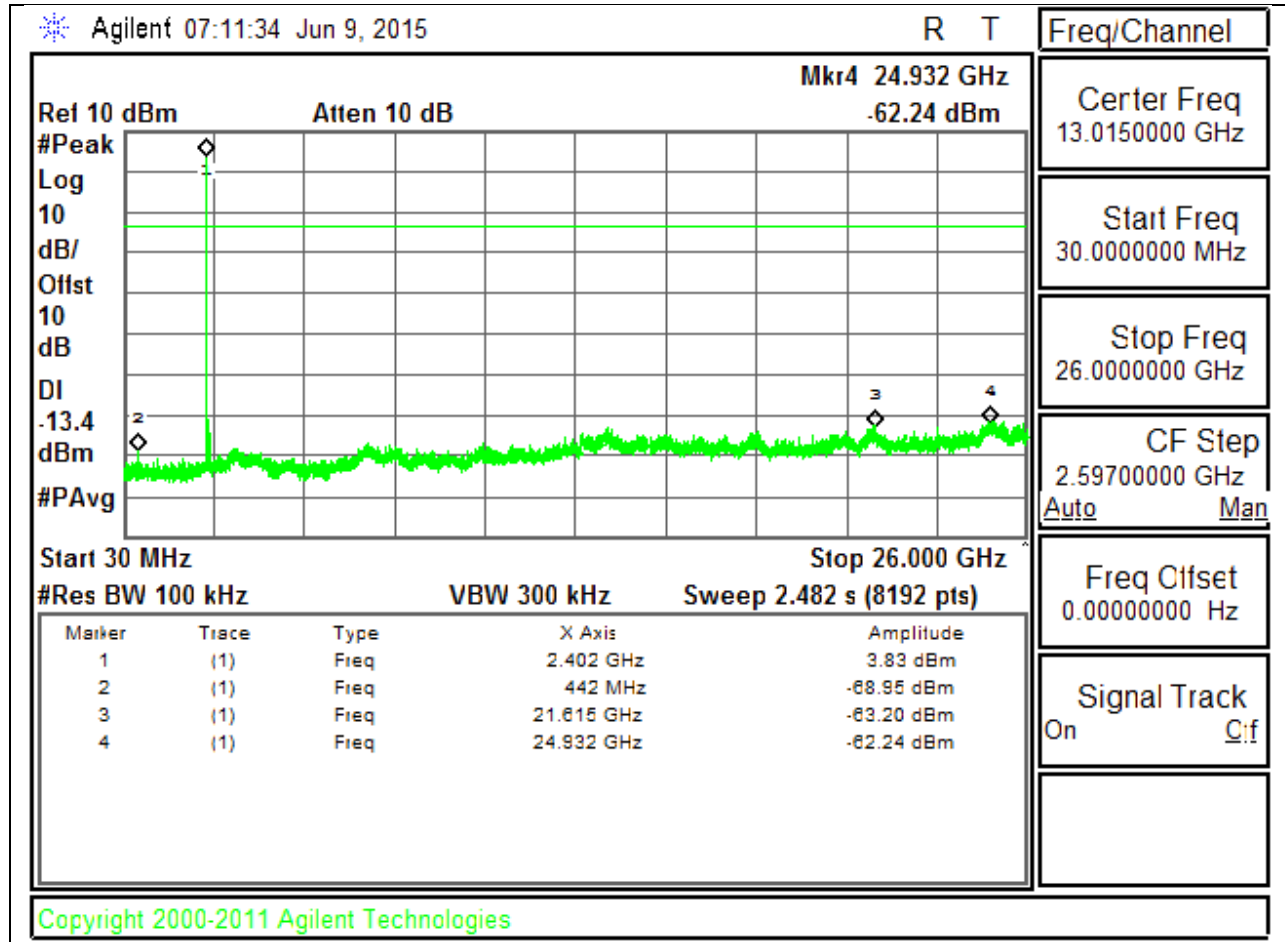
**RESULTS**

**SPURIOUS EMISSIONS, LOW CHANNEL**

**LOW CHANNEL BANDEDGE**

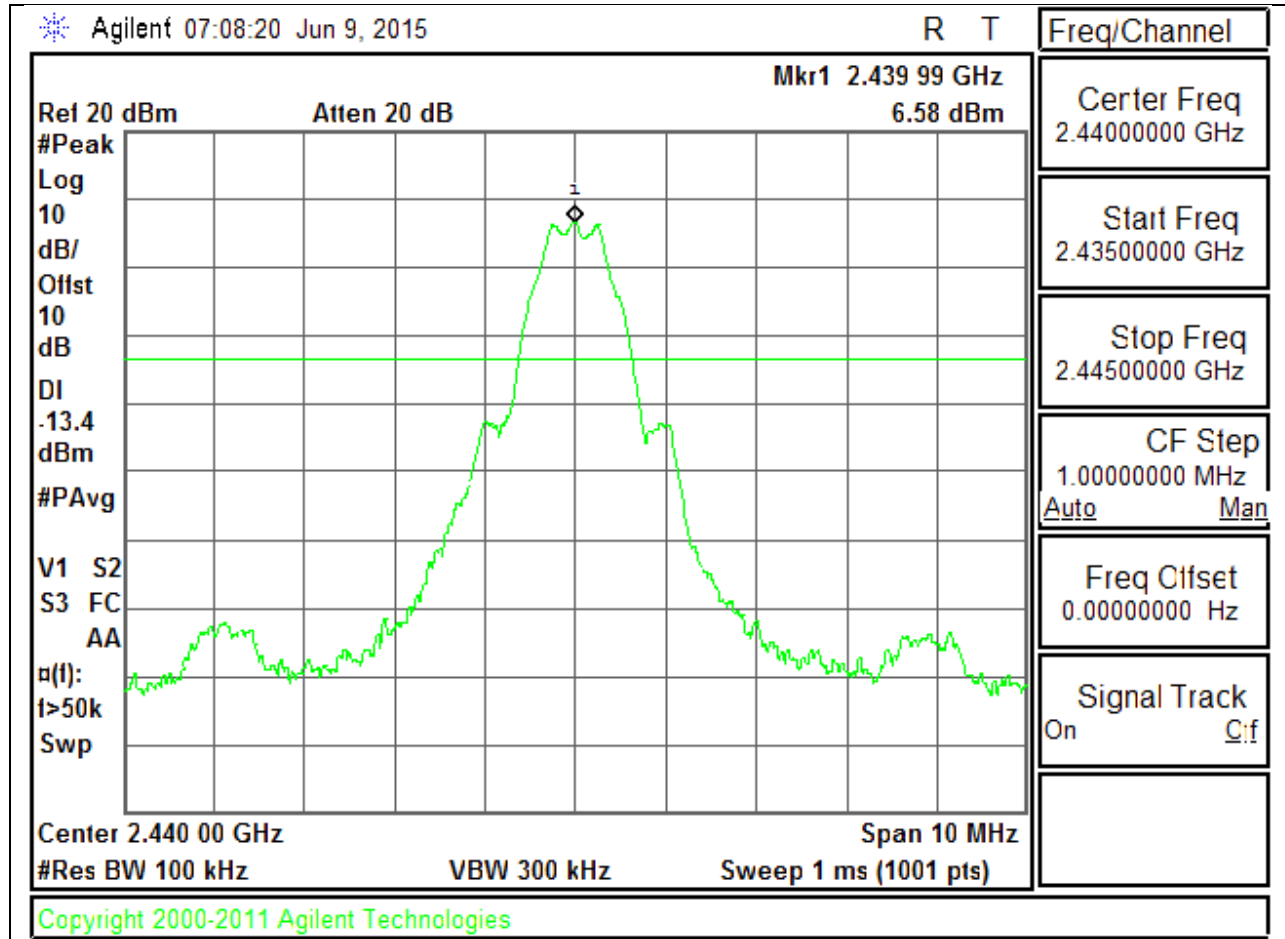


### LOW CHANNEL SPURIOUS

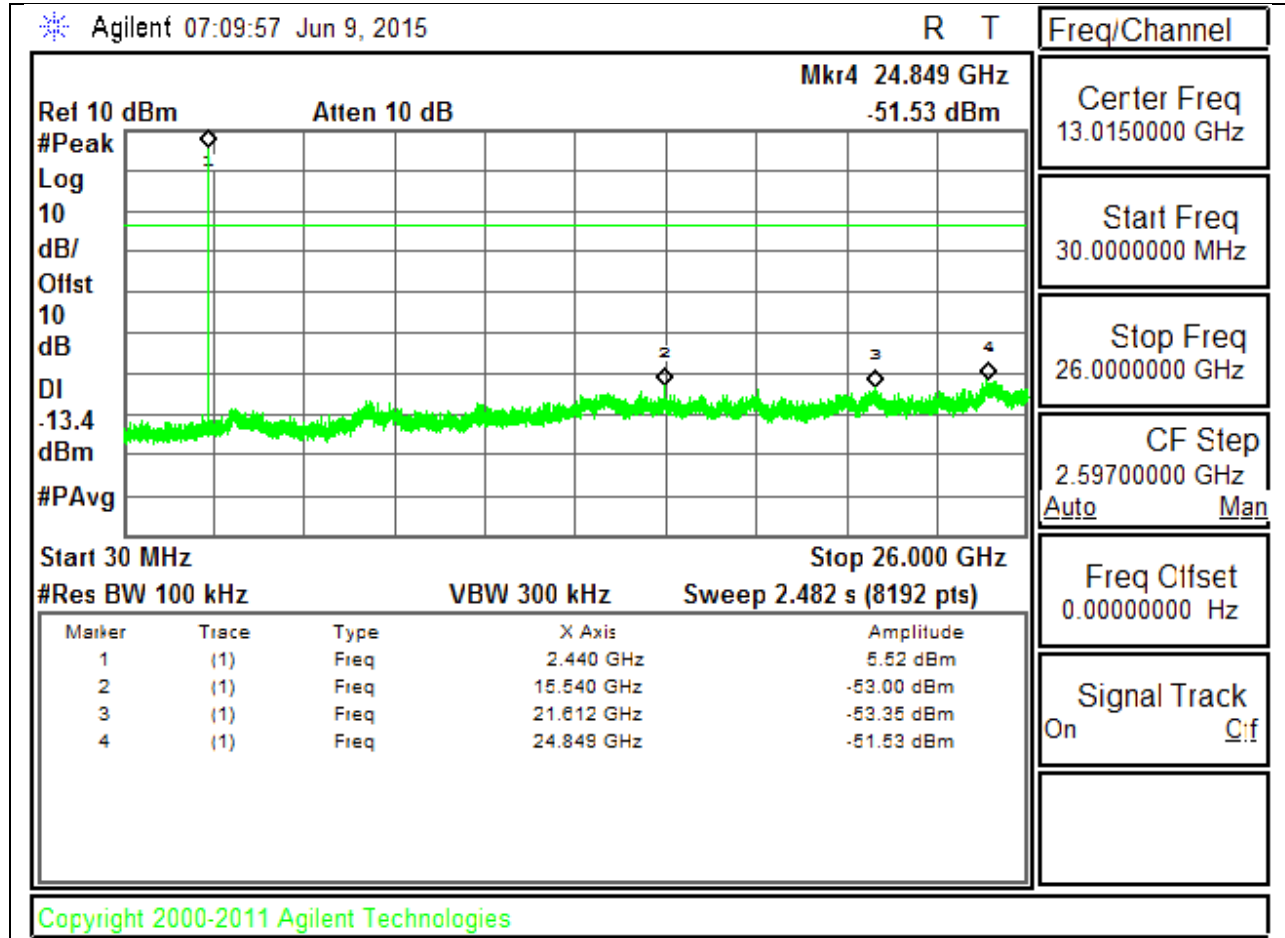


**SPURIOUS EMISSIONS, MID CHANNEL**

**MID CHANNEL REFERENCE**

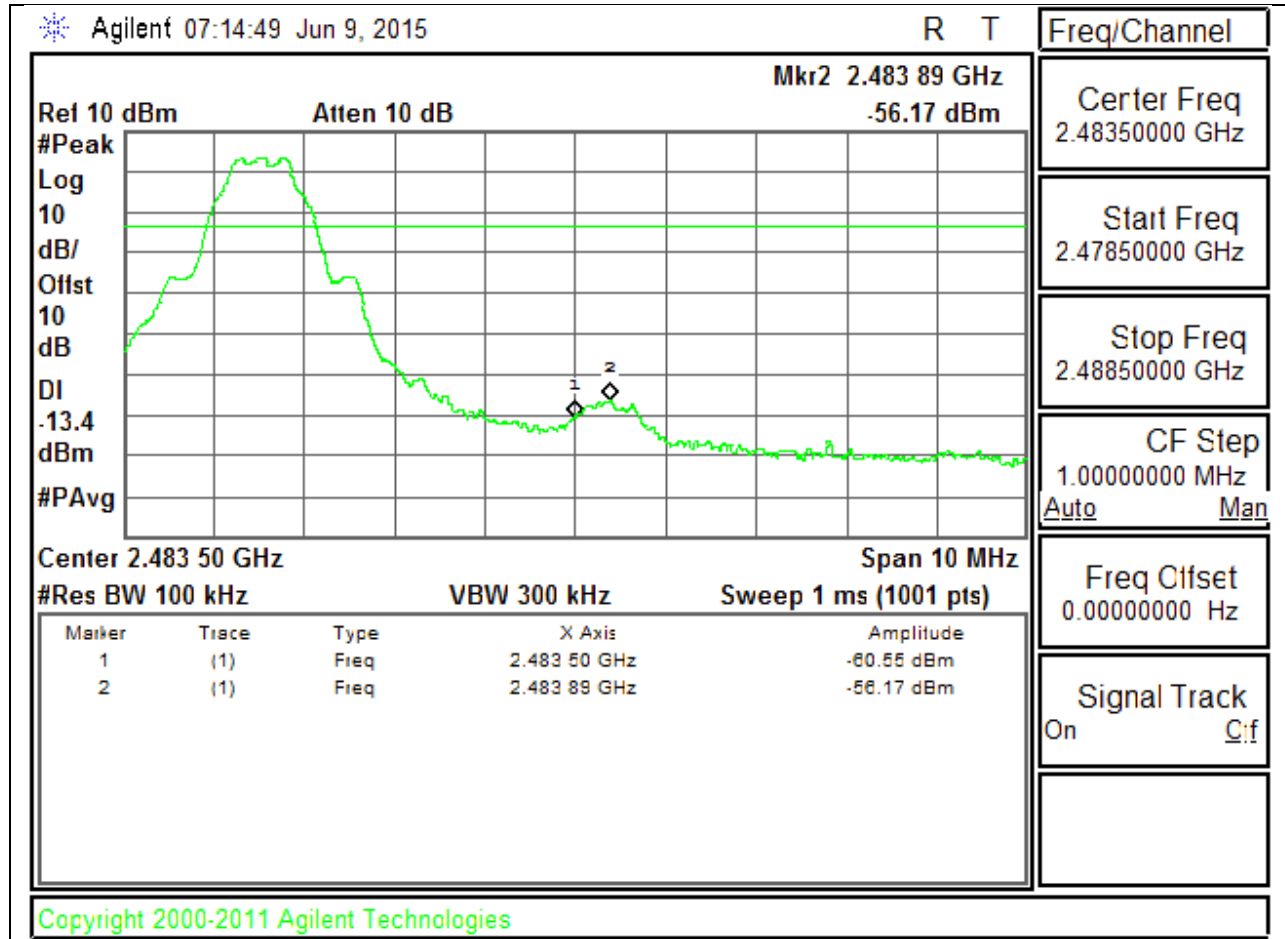


### MID CHANNEL SPURIOUS

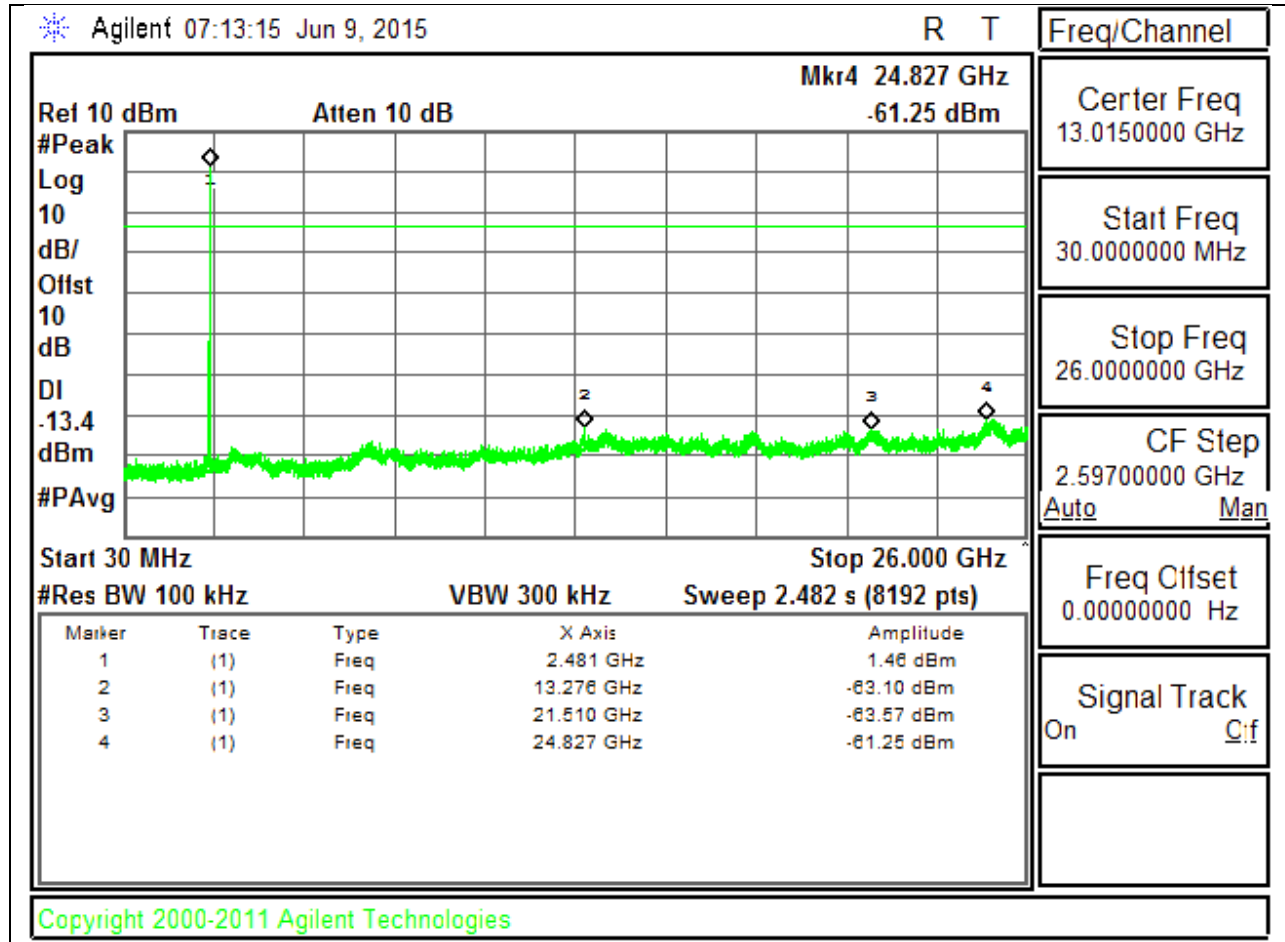


**SPURIOUS EMISSIONS, HIGH CHANNEL**

**HIGH CHANNEL BANDEDGE**



### HIGH CHANNEL SPURIOUS



## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE LIMITS

FCC §15.205 and §15.209

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 for below 1GHz and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. 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 add duty cycle factor for average measurements. Duty cycle factor =  $10 \log(1/x)$ . For this sample:  $DCF = 10\log(1/0.62)=2.04\text{dB}$

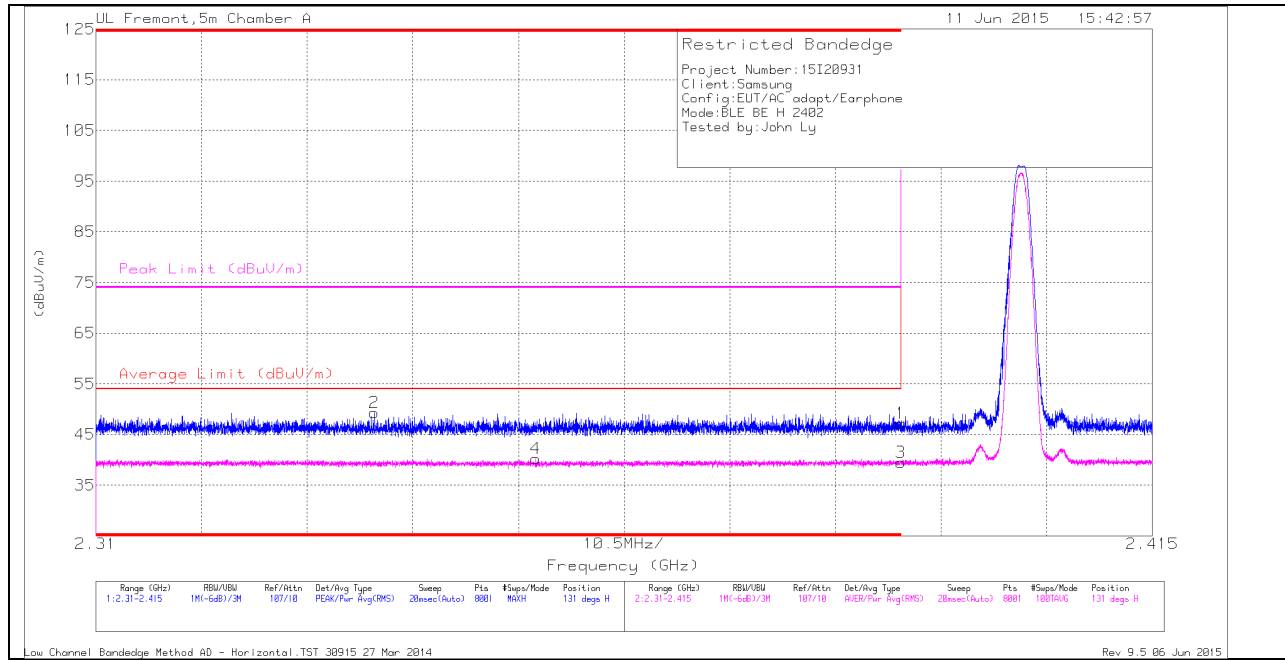
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

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

## 9.2. TRANSMITTER ABOVE 1 GHz RESTRICTED BANDEDGE (LOW CHANNEL)

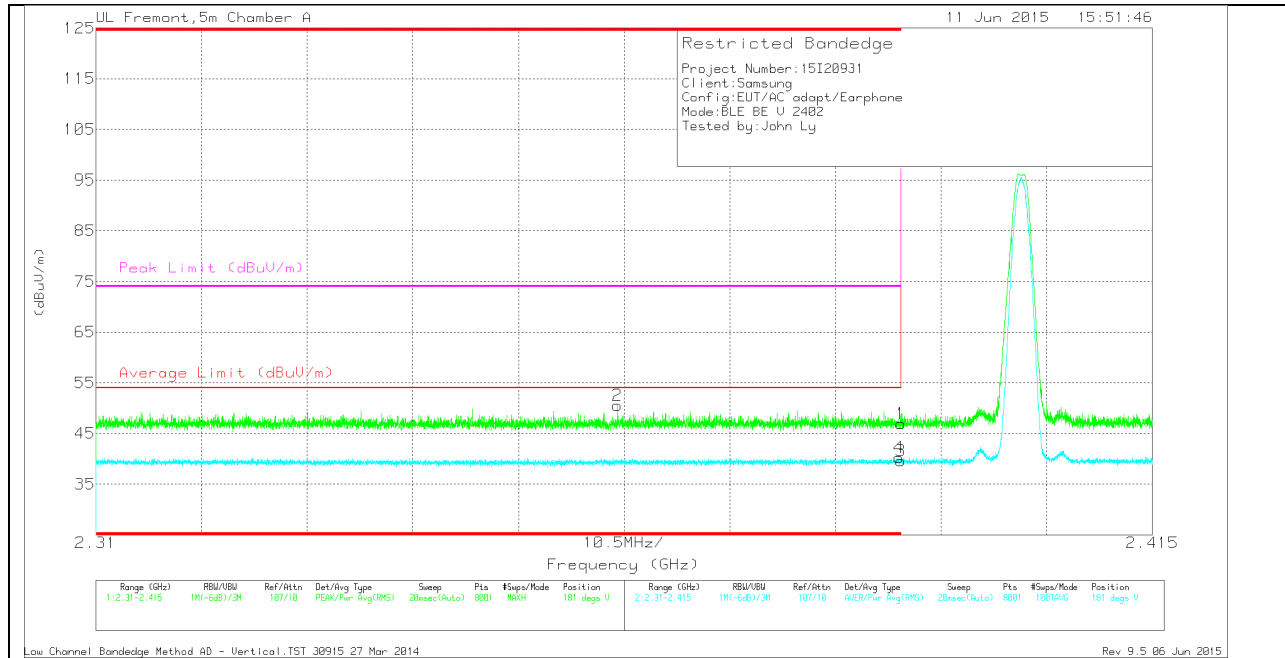
### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Fit r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.07	Pk	32	-24.9	0	47.17	-	-	74	-26.83	131	339	H
2	* 2.338	42.42	Pk	31.9	-25	0	49.32	-	-	74	-24.68	131	339	H
3	* 2.39	30.31	RMS	32	-24.9	2.04	39.45	54	-14.55	-	-	131	339	H
4	* 2.354	31.29	RMS	31.9	-25	2.04	40.23	54	-13.77	-	-	131	339	H

**VERTICAL PEAK AND AVERAGE PLOT**

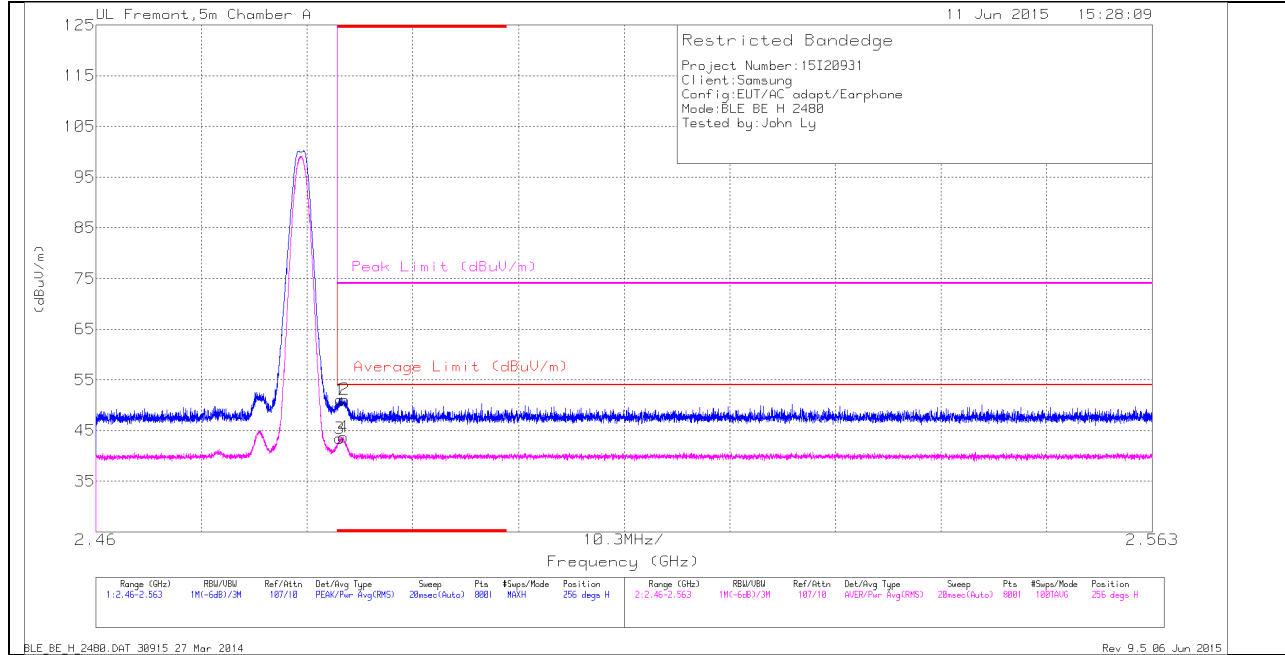


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.362	43.59	Pk	31.9	-24.9	0	50.59	-	-	74	-23.41	181	389	V
1	* 2.39	39.82	Pk	32	-24.9	0	46.92	-	-	74	-27.08	181	389	V
3	* 2.39	30.47	RMS	32	-24.9	2.04	39.61	54	-14.39	-	-	181	389	V
4	* 2.39	31.05	RMS	32	-24.9	2.04	40.19	54	-13.81	-	-	181	389	V

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

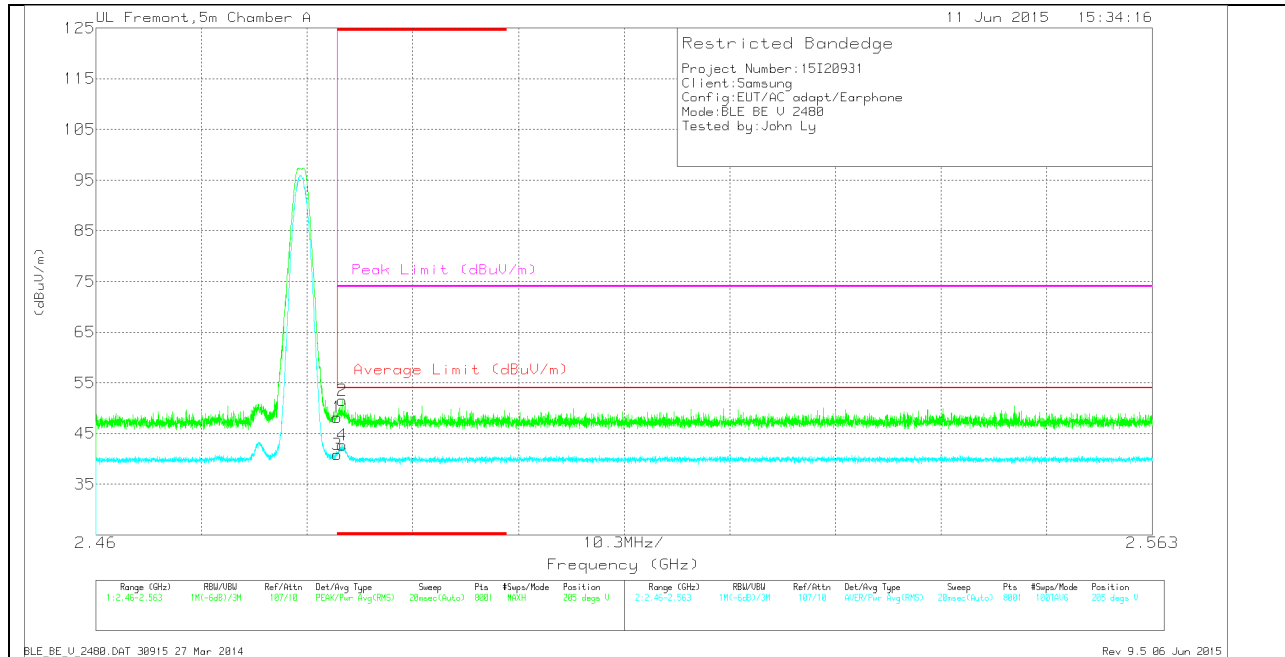
**HORIZONTAL PEAK AND AVERAGE PLOT**



**HORIZONTAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Fitter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.75	Pk	32.1	-24.8	0	51.05	-	-	74	-22.95	256	306	H
2	* 2.484	43.8	Pk	32.1	-24.8	0	51.1	-	-	74	-22.9	256	306	H
3	* 2.484	34.14	RMS	32.1	-24.8	2.04	43.48	54	-10.52	-	-	256	306	H
4	* 2.484	34.42	RMS	32.1	-24.8	2.04	43.76	54	-10.24	-	-	256	306	H

**VERTICAL PEAK AND AVERAGE PLOT**

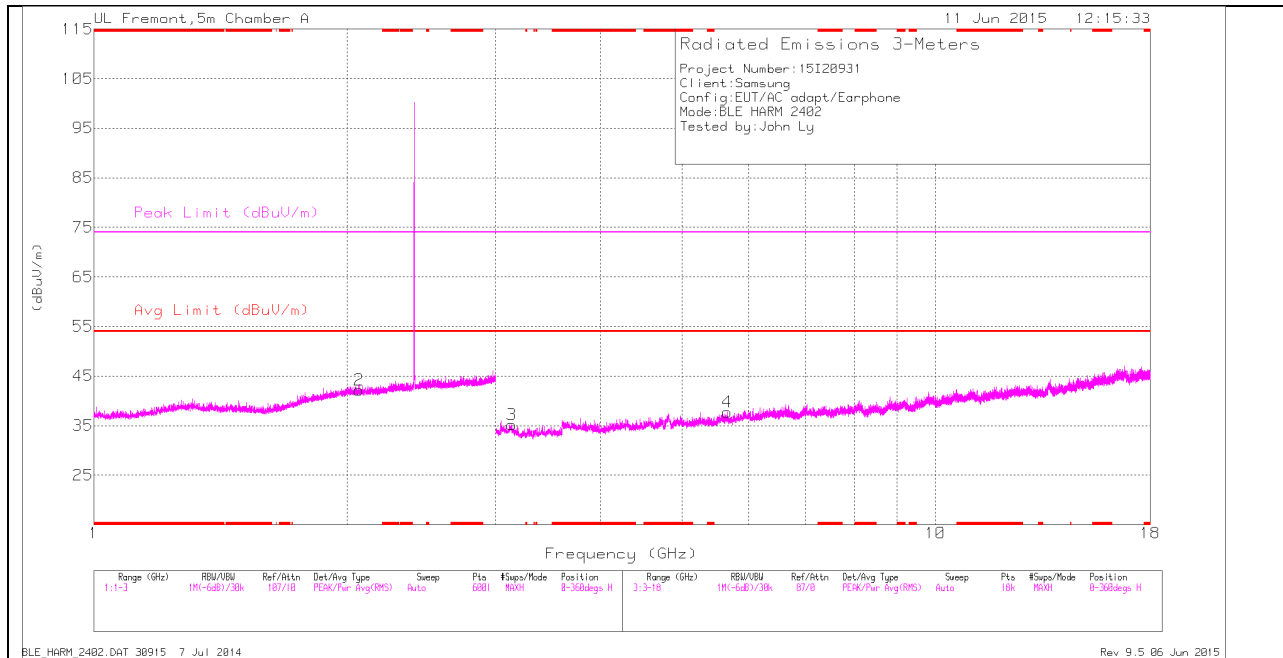


**VERTICAL DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Filter/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.86	Pk	32.1	-24.8	0	48.16	-	-	74	-25.84	205	394	V
2	* 2.484	44.24	Pk	32.1	-24.8	0	51.54	-	-	74	-22.46	205	394	V
3	* 2.484	31.5	RMS	32.1	-24.8	2.04	40.84	54	-13.16	-	-	205	394	V
4	* 2.484	33.35	RMS	32.1	-24.8	2.04	42.69	54	-11.31	-	-	205	394	V

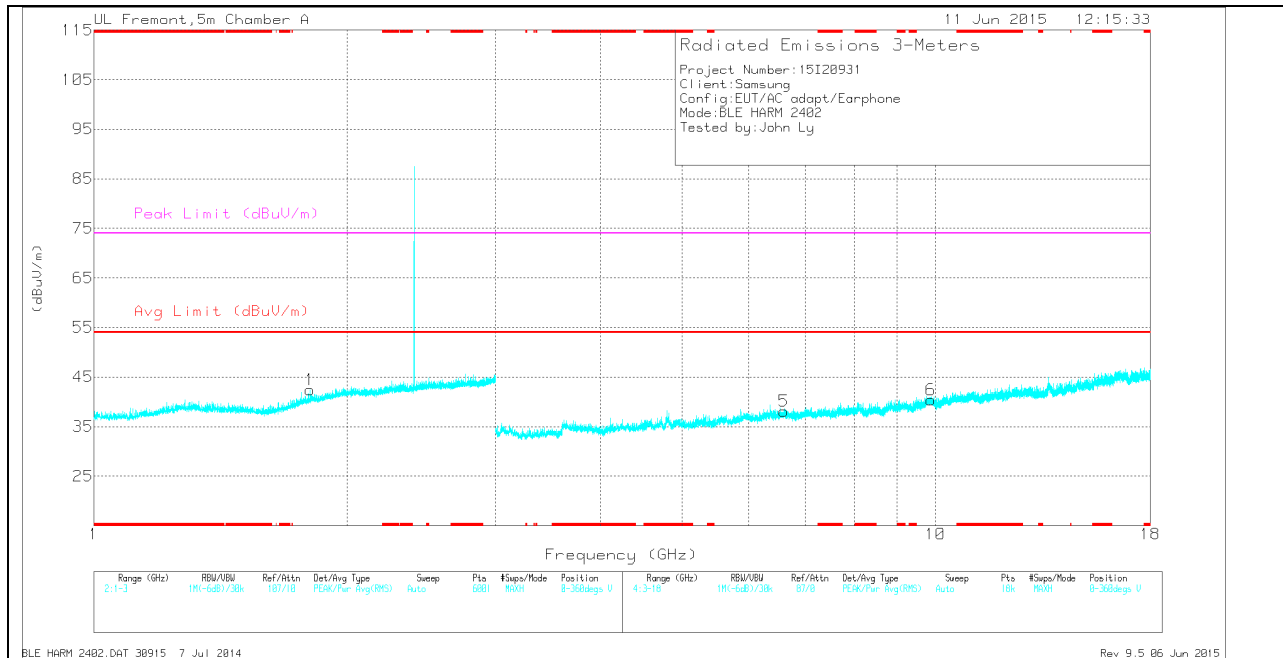
**HARMONICS AND SPURIOUS EMISSIONS**

**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.

### LOW CHANNEL 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

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.808	37.85	Pk	30	-25.4	0	42.45	-	-	74	-31.55	0-360	200	V
2	2.067	36.12	Pk	31.3	-25.3	0	42.12	-	-	74	-31.88	0-360	201	H
3	3.136	34.34	Pk	32.8	-32	0	35.14	-	-	74	-38.86	0-360	201	H
4	5.662	32.63	Pk	34.6	-29.5	0	37.73	-	-	74	-36.27	0-360	100	H
5	6.607	30.09	Pk	35.6	-27.6	0	38.09	-	-	74	-35.91	0-360	200	V
6	9.872	26.84	Pk	37	-23.4	0	40.44	-	-	74	-33.56	0-360	200	V

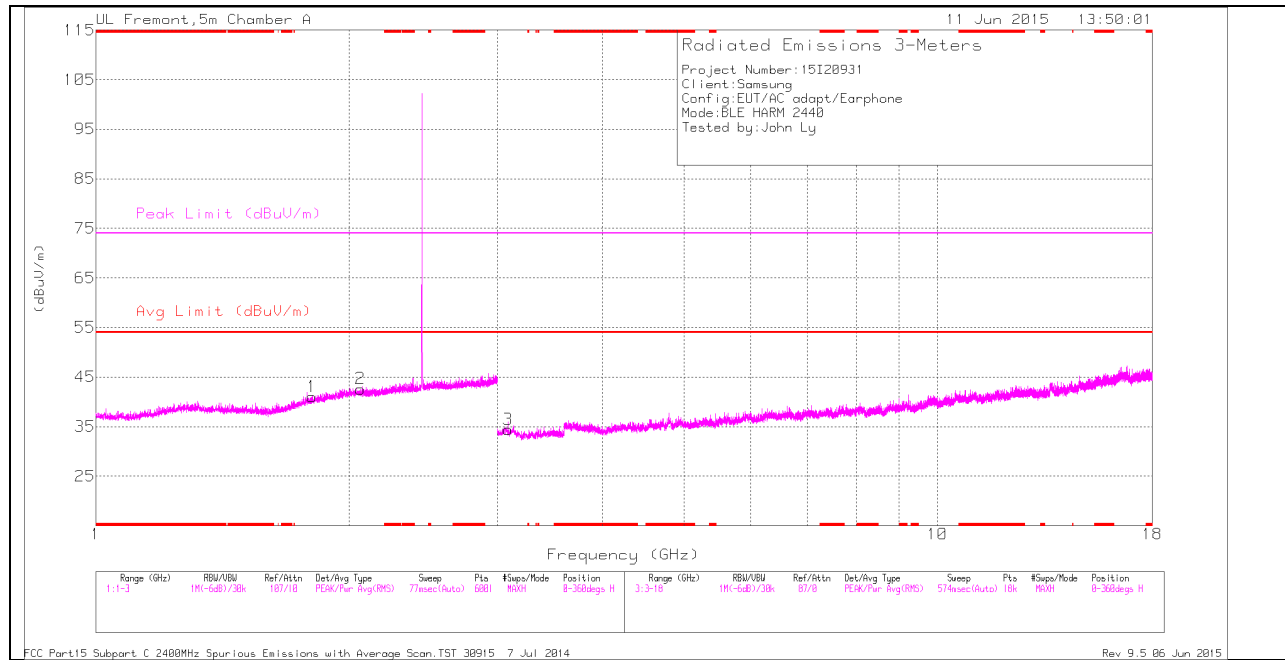
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.807	32.89	MAv1	30	-25.4	2.04	39.53	54	-14.47	-	-	231	202	V
1.808	45.51	PK2	30	-25.4	0	50.11	-	-	74	-23.89	231	202	V
2.069	44.41	PK2	31.3	-25.3	0	50.41	-	-	74	-23.59	231	146	H
2.069	32.44	MAv1	31.3	-25.3	2.04	40.48	54	-13.52	-	-	231	146	H
3.134	42.08	PK2	32.9	-32	0	42.98	-	-	74	-31.02	231	202	H
3.135	30.74	MAv1	32.8	-32	2.04	33.58	54	-20.42	-	-	231	202	H
5.66	39.59	PK2	34.6	-29.5	0	44.69	-	-	74	-29.31	231	100	H
5.662	28.48	MAv1	34.6	-29.5	2.04	35.62	54	-18.38	-	-	231	100	H
6.607	37.78	PK2	35.6	-27.6	0	45.78	-	-	74	-28.22	231	201	V
6.609	27.07	MAv1	35.6	-27.6	2.04	37.11	54	-16.89	-	-	231	201	V
9.873	35.1	PK2	37	-23.4	0	48.7	-	-	74	-25.3	231	201	V
9.874	24.09	MAv1	37	-23.4	2.04	39.73	54	-14.27	-	-	231	201	V

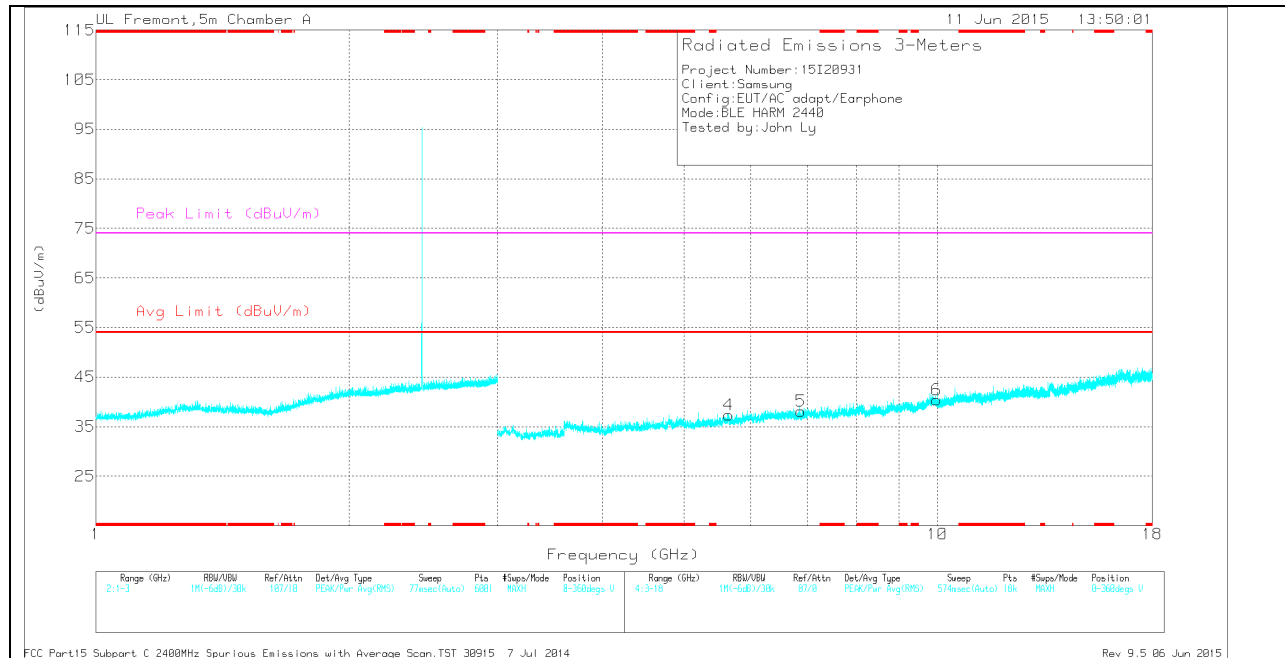
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

### 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.

### MID CHANNEL 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**

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.806	36.43	Pk	30	-25.4	0	41.03	-	-	74	-32.97	0-360	100	H
2	2.062	36.62	Pk	31.3	-25.3	0	42.62	-	-	74	-31.38	0-360	100	H
3	3.087	33.43	Pk	32.9	-31.9	0	34.43	-	-	74	-39.57	0-360	201	H
4	5.646	32.01	Pk	34.6	-29.3	0	37.31	-	-	74	-36.69	0-360	200	V
5	6.882	30.47	Pk	35.6	-27.9	0	38.17	-	-	74	-35.83	0-360	200	V
6	9.979	27.07	Pk	37	-23.7	0	40.37	-	-	74	-33.63	0-360	200	V

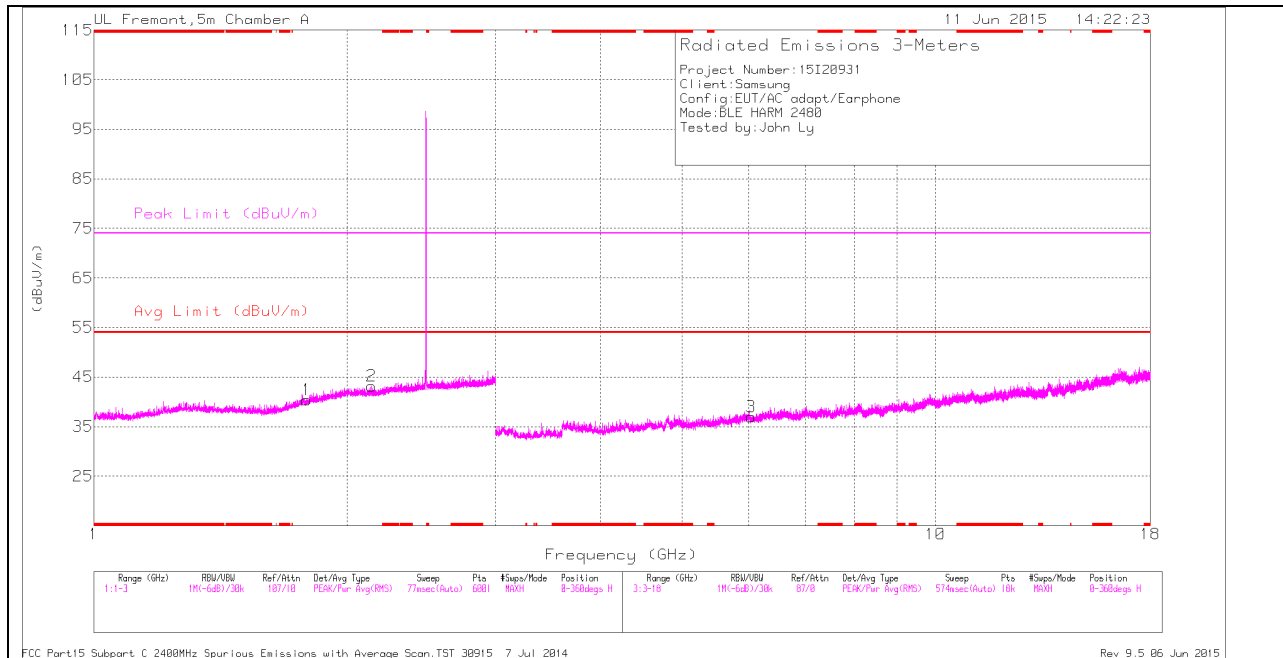
PK - Peak detector

*RADIATED EMISSIONS*

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.804	44.68	PK2	30	-25.5	0	49.18	-	-	74	-24.82	360	100	H
1.805	33.17	MAv1	30	-25.5	2.04	39.71	54	-14.29	-	-	360	100	H
2.062	44.51	PK2	31.3	-25.3	0	50.51	-	-	74	-23.49	360	100	H
2.063	32.92	MAv1	31.3	-25.3	2.04	40.96	54	-13.04	-	-	360	100	H
3.086	30.48	MAv1	32.9	-31.9	2.04	33.52	54	-20.48	-	-	360	202	H
3.087	42.68	PK2	32.9	-31.9	0	43.68	-	-	74	-30.32	360	202	H
5.644	28.68	MAv1	34.6	-29.3	2.04	36.02	54	-17.98	-	-	360	202	V
5.648	39.57	PK2	34.6	-29.4	0	44.77	-	-	74	-29.23	360	202	V
6.882	38.07	PK2	35.6	-27.9	0	45.77	-	-	74	-28.23	360	202	V
6.882	26.82	MAv1	35.6	-27.9	2.04	36.56	54	-17.44	-	-	360	202	V
9.977	23.94	MAv1	37	-23.7	2.04	39.28	54	-14.72	-	-	360	202	V
9.978	34.85	PK2	37	-23.7	0	48.15	-	-	74	-25.85	360	202	V

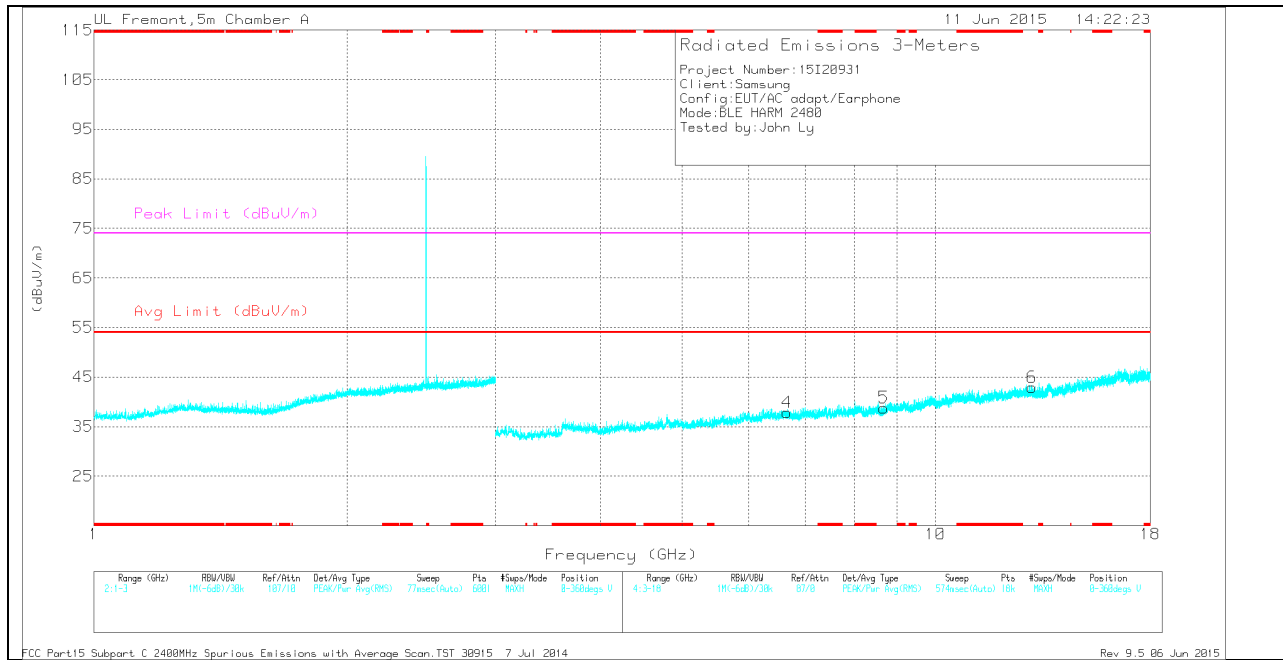
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### HIGH CHANNEL HORIZONTAL



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

### HIGH CHANNEL 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

*TRACE MARKERS*

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.789	36.1	Pk	29.8	-25.5	0	40.4	-	-	74	-33.6	0-360	100	H
2	2.139	36.96	Pk	31.4	-25.2	0	43.16	-	-	74	-30.84	0-360	201	H
3	6.041	30.76	Pk	35.4	-29.2	0	36.96	-	-	74	-37.04	0-360	201	H
4	6.665	29.78	Pk	35.6	-27.5	0	37.88	-	-	74	-36.12	0-360	100	V
5	8.685	28.81	Pk	35.9	-25.9	0	38.81	-	-	74	-35.19	0-360	100	V
6	13.026	26.91	Pk	39.1	-23.1	0	42.91	-	-	74	-31.09	0-360	200	V

PK - Peak detector

*RADIATED EMISSIONS*

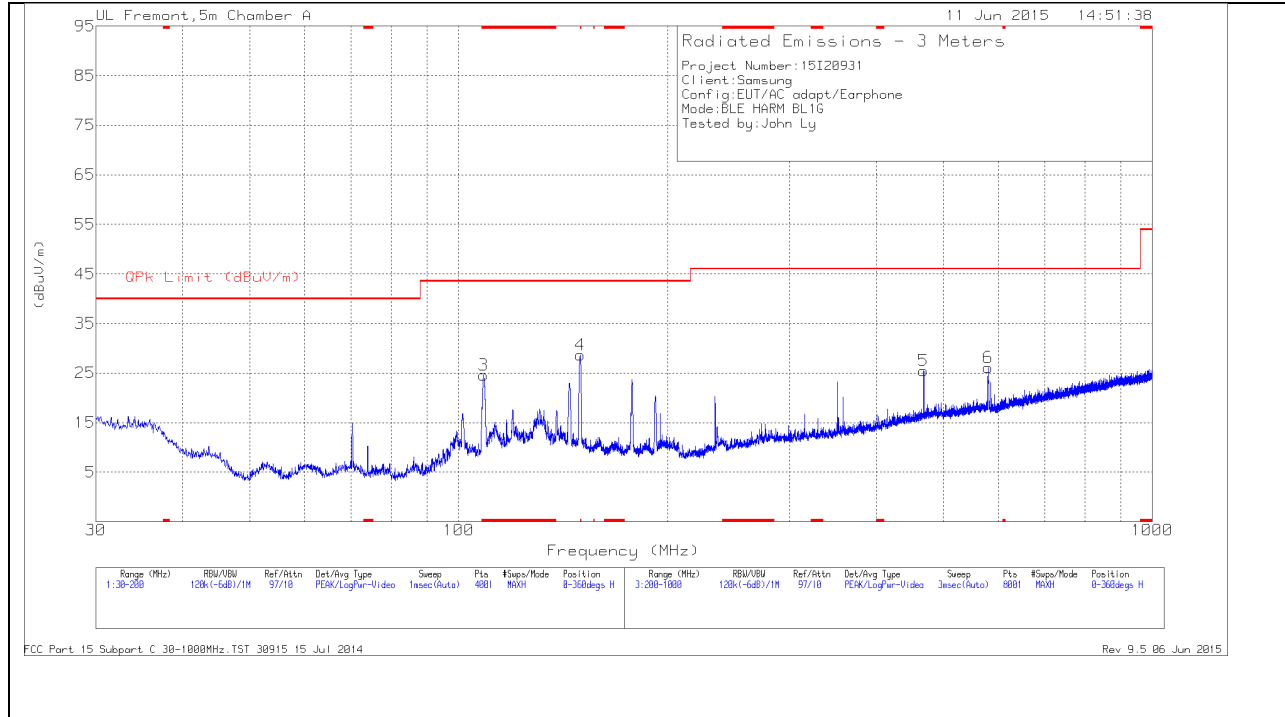
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Ftr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.789	45.27	PK2	29.8	-25.5	0	49.57	-	-	74	-24.43	360	100	H
1.789	32.95	MAV1	29.8	-25.5	2.04	39.29	54	-14.71	-	-	360	100	H
2.137	32.83	MAV1	31.4	-25.2	2.04	41.07	54	-12.93	-	-	360	202	H
2.139	44.52	PK2	31.4	-25.2	0	50.72	-	-	74	-23.28	360	202	H
6.041	38.98	PK2	35.4	-29.2	0	45.18	-	-	74	-28.82	360	202	H
6.042	27.98	MAV1	35.4	-29.2	2.04	36.22	54	-17.78	-	-	360	202	H
6.663	38.39	PK2	35.6	-27.5	0	46.49	-	-	74	-27.51	360	100	V
6.665	26.96	MAV1	35.6	-27.5	2.04	37.1	54	-16.9	-	-	360	100	V
8.685	25.58	MAV1	35.9	-25.9	2.04	37.62	54	-16.38	-	-	360	100	V
8.686	36.72	PK2	35.9	-25.9	0	46.72	-	-	74	-27.28	360	100	V

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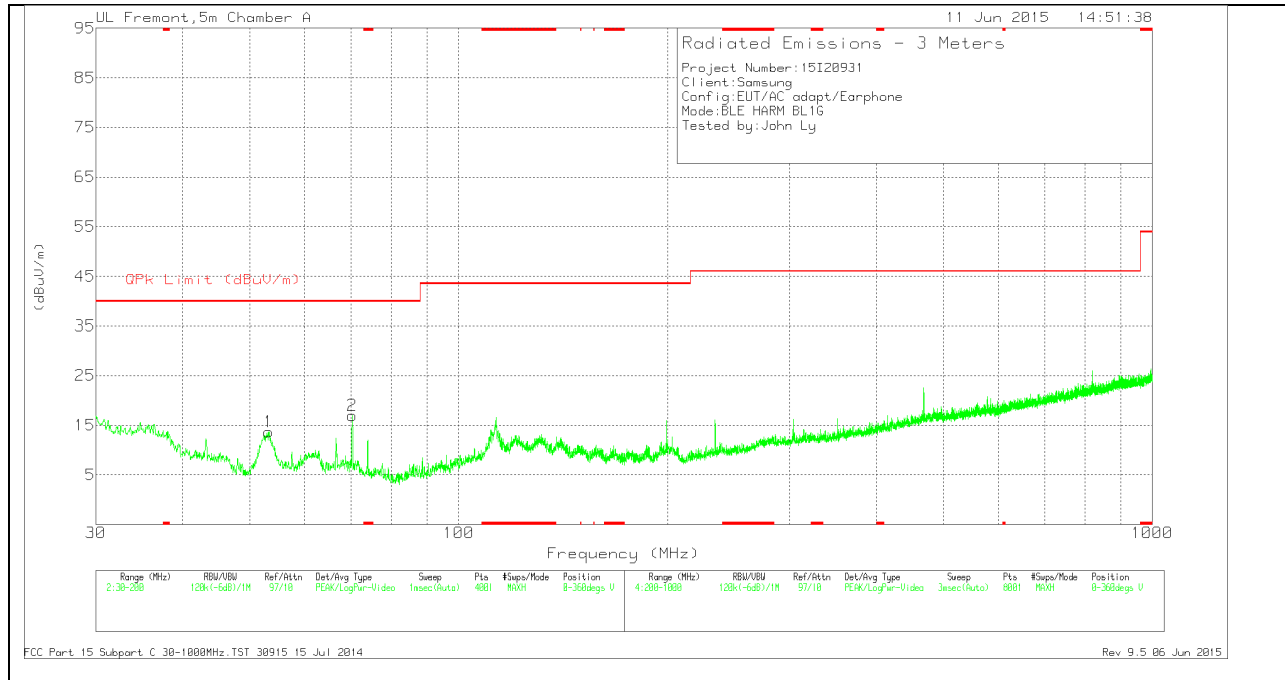
### 9.3. WORST-CASE BELOW 1 GHz

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

#### HORIZONTAL PLOT



### VERTICAL PLOT



### BELOW 1 GHz TABLE

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 108.6675	42.73	Pk	12.3	-30.5	24.53	43.52	-18.99	0-360	399	H
1	53.205	37.42	Pk	7.3	-31	13.72	40	-26.28	0-360	101	V
2	70.2475	39.69	Pk	8.1	-30.8	16.99	40	-23.01	0-360	101	V
4	149.68	46.11	Pk	12.7	-30.2	28.61	43.52	-14.91	0-360	100	H
5	468.3	36.95	Pk	17.2	-28.7	25.45	46.02	-20.57	0-360	199	H
6	579.95	36.24	Pk	18.6	-28.7	26.14	46.02	-19.88	0-360	299	H

PK - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 9 Jul 2013 Rev 9.5 12 Jun 2013

## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

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

\*Decreases with the logarithm of the frequency.

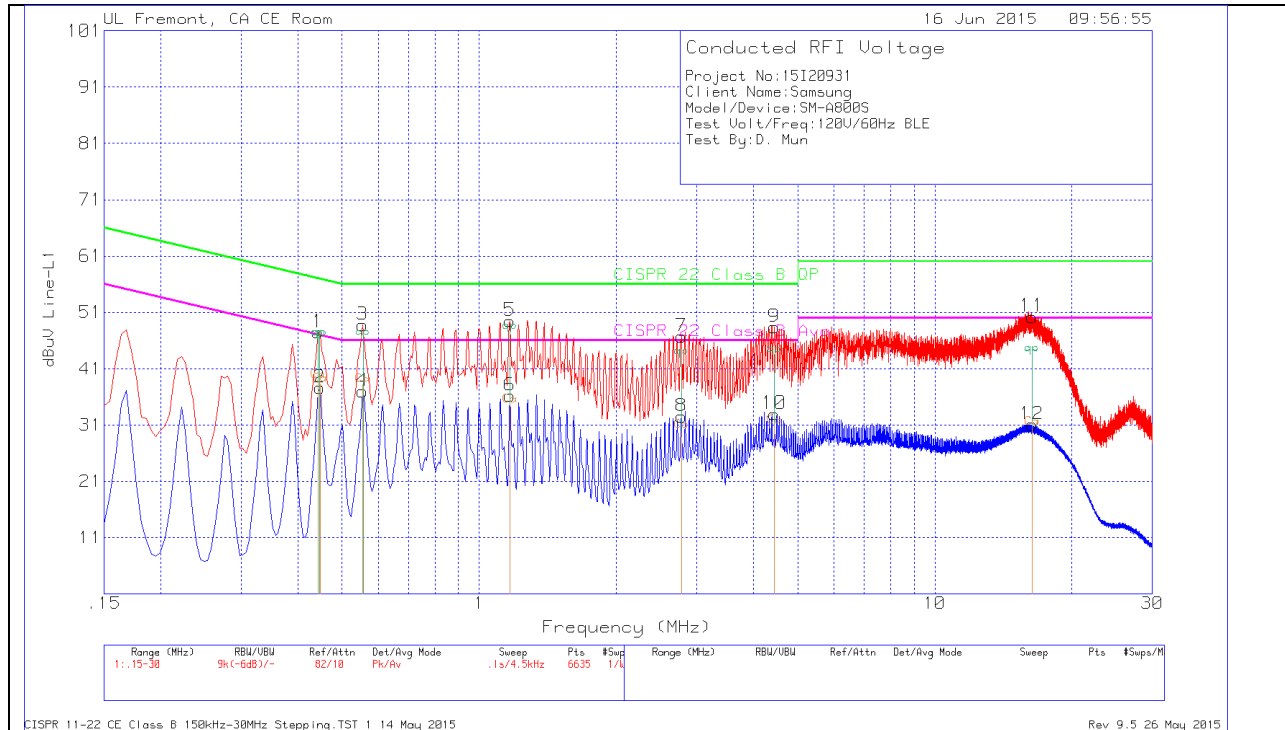
### TEST PROCEDURE

ANSI C63.10

### RESULTS

#### 6 WORST EMISSIONS

LINE 1 PLOT



**LINE 1 RESULTS**

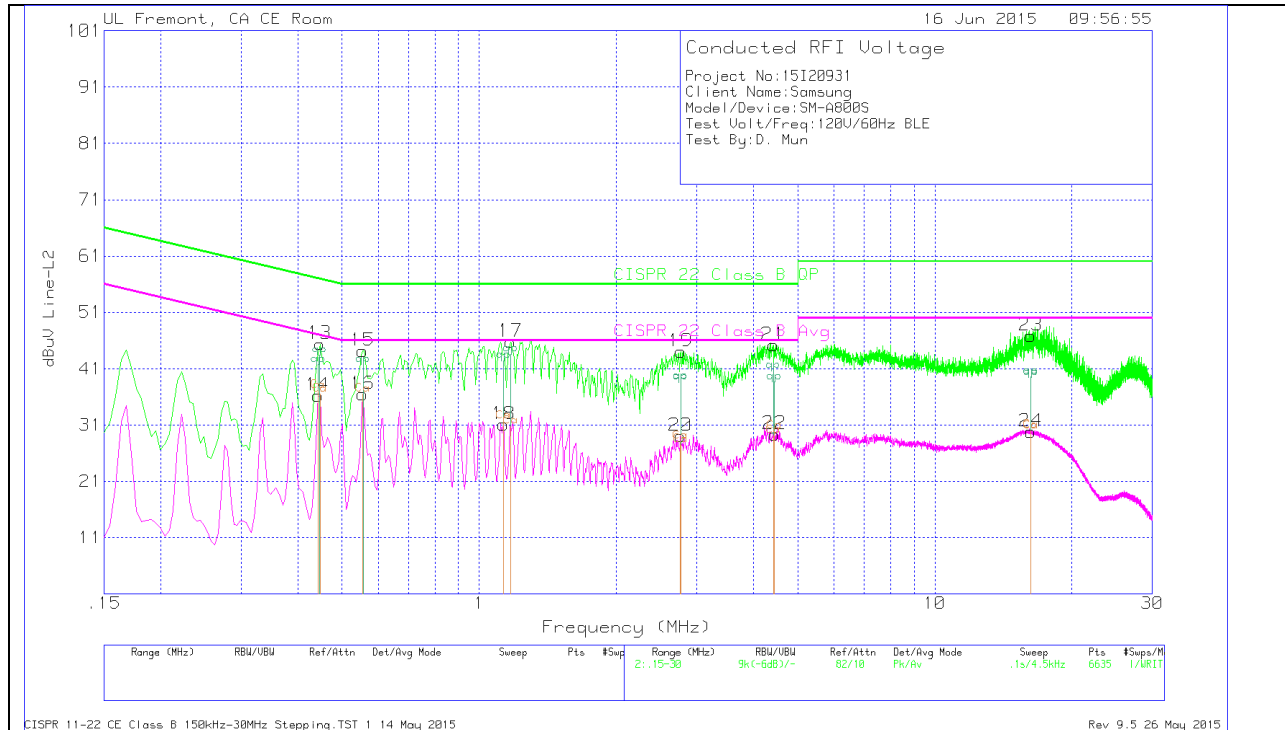
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.4425	47.05	Pk	.4	0	47.45	57.01	-9.56		
2	.447	37.22	Av	.4	0	37.62	-	-	46.93	-9.31
3	.555	48.48	Pk	.3	0	48.78	56	-7.22		
4	.555	36.71	Av	.3	0	37.01	-	-	46	-8.99
5	1.167	49.18	Pk	.2	.1	49.48	56	-6.52		
6	1.167	35.91	Av	.2	.1	36.21	-	-	46	-9.79
7	2.778	46.45	Pk	.2	.1	46.75	56	-9.25		
8	2.778	32.23	Av	.2	.1	32.53	-	-	46	-13.47
9	4.443	48.07	Pk	.2	.1	48.37	56	-7.63		
10	4.443	32.65	Av	.2	.1	32.95	-	-	46	-13.05
11	16.3455	49.72	Pk	.3	.2	50.22	60	-9.78		
12	16.341	30.59	Av	.3	.2	31.09	-	-	50	-18.91

Pk - Peak detector

Av - Average detection

### LINE 2 PLOT



**LINE 2 RESULTS**

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
13	.447	44.98	Pk	.4	0	45.38	56.93	-11.55		
14	.4425	35.84	Av	.4	0	36.24	-	-	47.01	-10.77
15	.555	43.89	Pk	.3	0	44.19	56	-11.81		
16	.555	36.17	Av	.3	0	36.47	-	-	46	-9.53
17	1.1715	45.36	Pk	.3	.1	45.76	56	-10.24		
18	1.131	30.7	Av	.3	.1	31.1	-	-	46	-14.9
19	2.769	43.74	Pk	.2	.1	44.04	56	-11.96		
20	2.7645	28.73	Av	.2	.1	29.03	-	-	46	-16.97
21	4.4205	44.89	Pk	.2	.1	45.19	56	-10.81		
22	4.4475	29.05	Av	.2	.1	29.35	-	-	46	-16.65
23	16.242	46.34	Pk	.3	.2	46.84	60	-13.16		
24	16.2555	29.32	Av	.3	.2	29.82	-	-	50	-20.18