



**MOTOROLA**

**MOBILE DEVICES BUSINESS**

**PRODUCT SAFETY AND COMPLIANCE  
EMC LABORATORY**

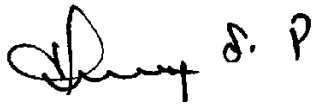
**EMC TEST REPORT - Addendum**

**Test Report Number** – 18257-1BT

**Report Date** – May 12, 2006

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature: 

Name: Thanigaiselvan Palaniswami

Title: EMC Engineer

Date: May 12, 2006

This report must not be reproduced, except in full, without written approval from this laboratory.

THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY A2LA OR ANY AGENCY OF THE U.S. GOVERNMENT.

A2LA Certificate Number: 1651-01

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**Test Report Details**

Tests Performed By: Motorola Mobile Devices Business  
Product Safety and Compliance Group  
600 North US Hwy 45  
Libertyville, IL 60048  
Phone: 847- 523-6167  
Fax: 847- 523-4538  
Motorola MDB FRN: 0004321311  
FCC Registration Number: 316588  
Industry Canada Number: IC3908-1

Underwriters Laboratories, Inc.  
International EMC Services  
333 Pfingsten Rd.  
Northbrook, IL 60062  
Phone: 847-664-3957  
Fax: 847-313-3957  
NVLAP Lab Code: 100414-0

Tests Requested By: Motorola Inc.  
Mobile Devices Business  
600 North US Hwy 45  
Libertyville, IL 60048

Product Type: Cellular Phone

Signaling Capability: Bluetooth

FCC ID: IHDT6GP1

Serial Numbers: 00440102085657

Testing Complete Date: May 04, 2006

**Applicable Standards**

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

  X   Part 15 Subpart C – Intentional Radiators

DA 00-705, “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” published by the Federal Communications Commission was also used in the testing of this product.

**Summary of Testing**

Test	Test Name	Pass/Fail
1	Carrier Frequency Separation	Pass
2	Number of Hopping Frequencies	Pass
3	Time of Occupancy (Dwell Time)	Pass
4	20 dB Bandwidth	Pass
5	Spurious RF Conducted Emissions	Pass
6	Field Strength of Spurious Emissions	Pass
7	Max Power	N/A
8	Band Edges	Pass
9	Conducted Spurious Emissions	Pass

Test	Test Name	Results
1	Carrier Frequency Separation	1 MHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.875 ms
4	20 dB Bandwidth	934 kHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	0.87 dBm
8	Band Edges	See plots
9	Conducted Spurious Emissions	See plots

**General and Special Conditions**

The Cellular Phone with the FCC ID IHDT6GP1 hereinafter referred to as the Equipment Under Test or EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment with an average temperature of 22° C and relative humidity of 50%.

**Equipment and Cable Configurations**

The EUT was tested in a stand-alone configuration that is representative of typical use.

**Measuring Equipment and Calibration Information**

<b>Manufacturer</b>	<b>Equipment Type</b>	<b>Model No.</b>	<b>Serial Number</b>	<b>Cal. Due Date</b>
Hewlett-Packard	EMC Analyzer	E7405A	US40240219	6/8/2006
Attenuator	Weinschel	AS-6	6677	11/10/2006
Attenuator	Weinschel	AS-3	6677	11/10/2006
Attenuator	Agilent	8491A	36904	9/19/2006
Rohde & Schwarz	Mobile Test Set	CMU 200	106338	N/A
Hewlett Packard	QP Adapter	85650A	2811A01069	1/03/07
Hewlett Packard	S/A Display	8566B	2542A12974	1/03/07
Hewlett Packard	S/A	8566B	2637A03376	1/03/07
Rhode & Schwartz	S/A	FSEK	DE25315	1/04/07
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	7/22/06
Chase	Log-Periodic Antenna	UPA6108	1120	8/02/06
EMCO	Horn Antenna 1-18GHz	3115	2638	7/29/06
EMCO	Horn Antenna 1-18GHz	3115	6546	10/18/06
Emco	Horn Antenna 2-4GHz	3161-02	9906-1052	N/A
Emco	Horn Antenna 4-8GHz	3161-03	9905-1041	N/A
Emco	Horn Antenna 8-12GHz	3160-07	9902-1114	N/A
Emco	Horn Antenna 12-18GHz	3160-08	9904-1100	N/A
Emco	Horn Antenna 18-26.5GHz	3160-09	990345-003	N/A

All equipment is on a one-year calibration cycle.

## **Description of Bluetooth Transmitter**

The EUT offers Bluetooth as a feature. The Bluetooth spread-spectrum, frequency hopping transceiver is designed to operate between 2400 and 2483.5 MHz. The Bluetooth antenna is mounted on the PCB inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a Bluetooth transmitter, it is designed operate with other Bluetooth devices as defined by industrial standard. In this application, the device is battery-operated.

The Bluetooth antenna gain is -5 dBi.

## **Measurement Procedures and Data**

### **CARRIER FREQUENCY SEPARATION**

CFR 47 Part 15.247

#### **Measurement Procedure**

The RF output port of the Equipment Under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

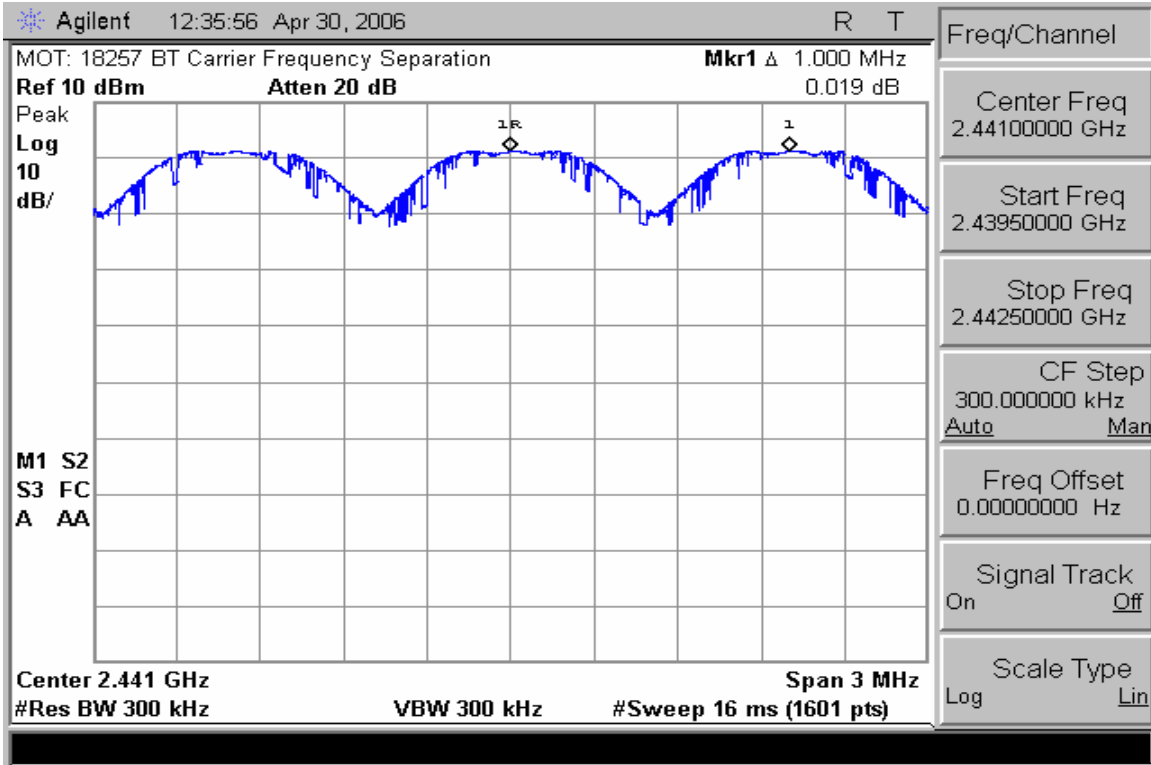
The Bluetooth transmitter of the EUT had its hopping function enabled. The following spectrum analyzer settings were used:

1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span
3. Video (or Average) Bandwidth (VBW)  $\geq$  RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

#### **Measurement Results**

See attached.



### Carrier Frequency Separation

## **NUMBER OF HOPPING FREQUENCIES**

CFR 47 Part 15.247

### **Measurement Procedure**

The RF output port of the Equipment Under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

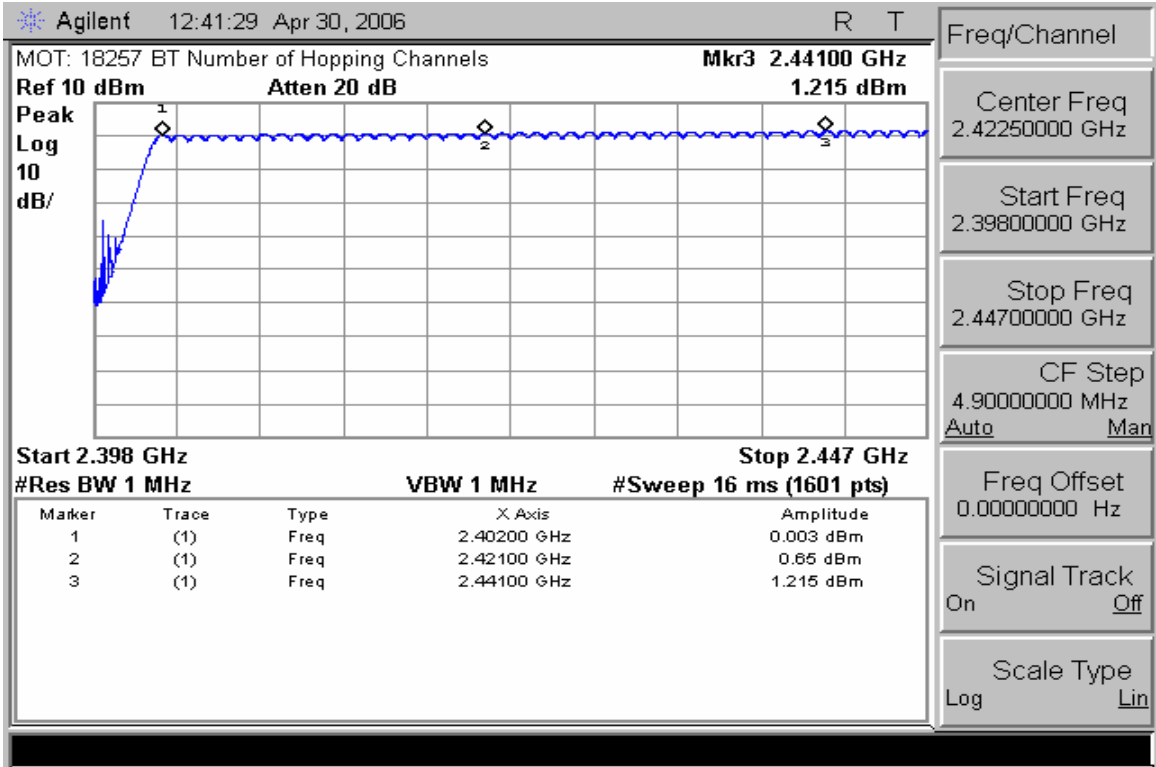
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = the frequency band of operation
2. RBW  $\geq$  1% of the span
3. VBW  $\geq$  RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

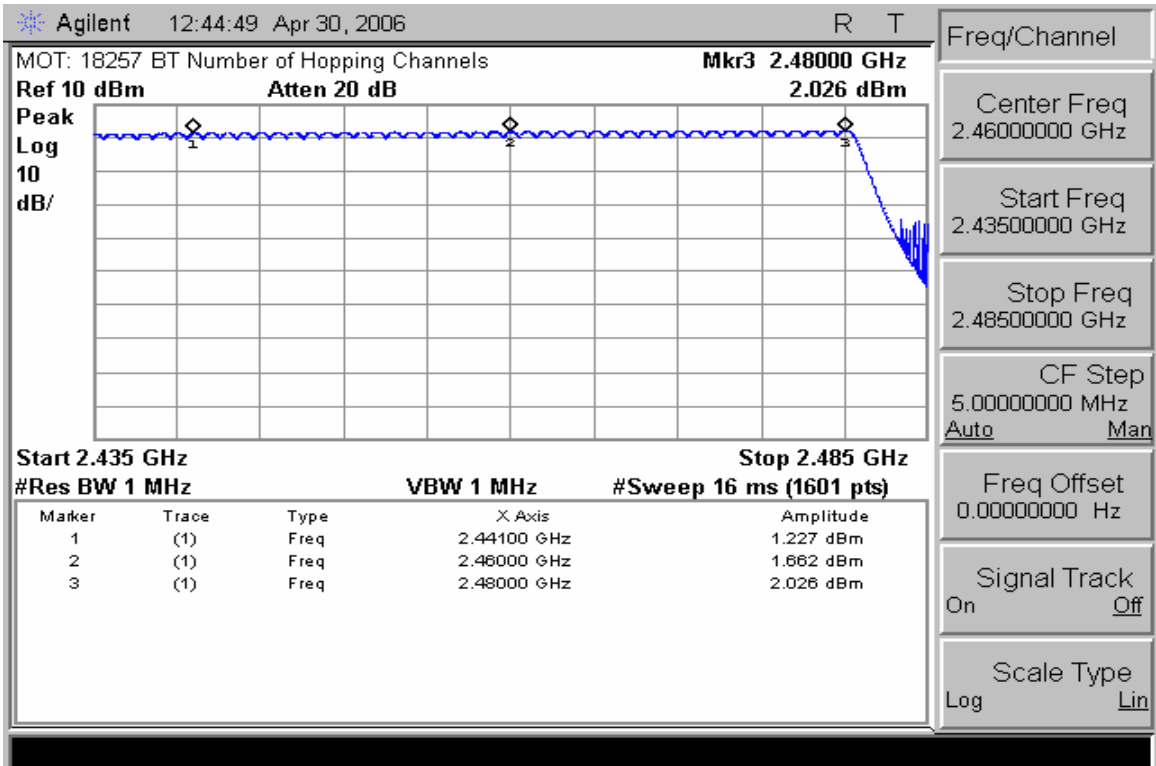
The trace was allowed to stabilize.

### **Measurement Results**

See attached.



**Number of Hopping Frequencies (Channels 0 – 39)**



**Number of Hopping Frequencies (Channels 39 – 78)**

**TIME OF OCCUPANCY (DWELL TIME)**

CFR47 Part 15.247

**Measurement Procedure**

The RF output port of the Equipment Under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

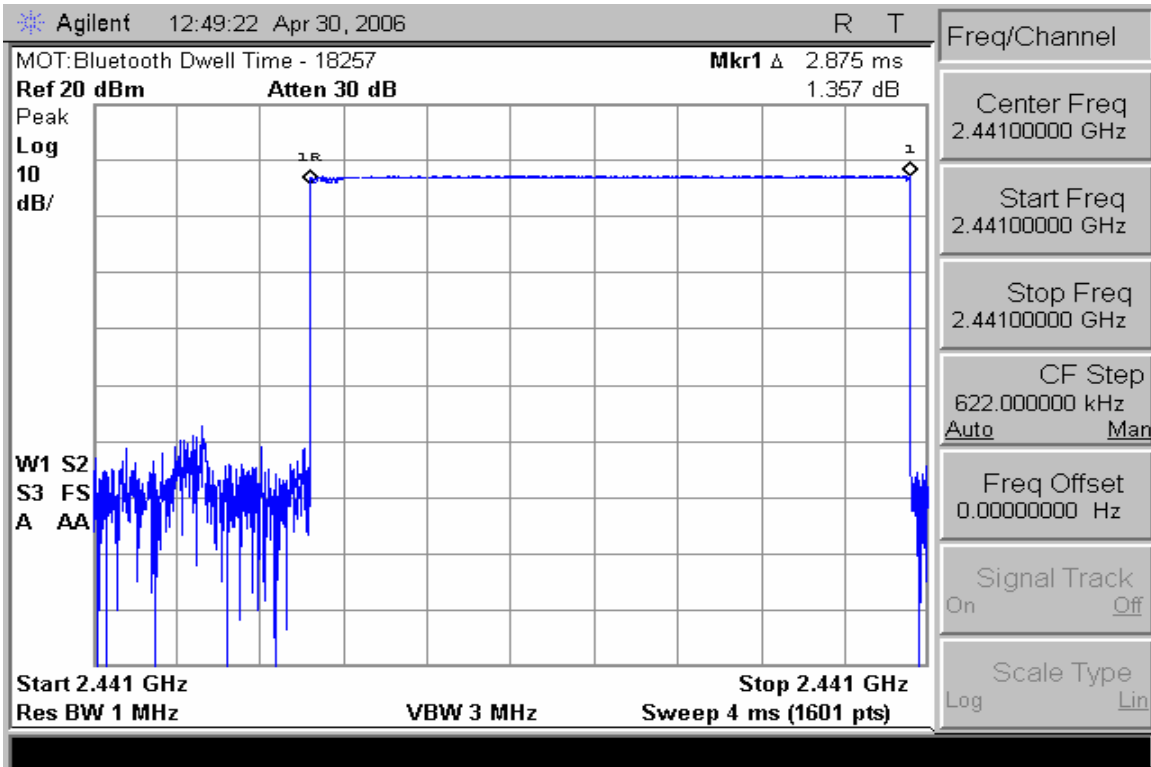
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW  $\geq$  RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

The marker-delta function was used to determine the dwell time.

**Measurement Results**

See attached



**Dwell Time**

## **20dB Bandwidth**

CFR 47 Part 15.247

### **Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW  $\geq$  1% of the 20dB span
3. VBW  $\geq$  RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20dB bandwidth of the emission.

### **Measurement Results**

See attached



**FIELD STRENGTH OF SPURIOUS EMISSIONS**

CFR Part 2.1053, 15.247

**Measurement Procedure**

The Equipment-Under-Test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

$$\text{Field Strength (dBuV/m)} = \text{EMI Receiver Level (dBuV)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)} + \text{Antenna Correction Factor (1/m)}$$

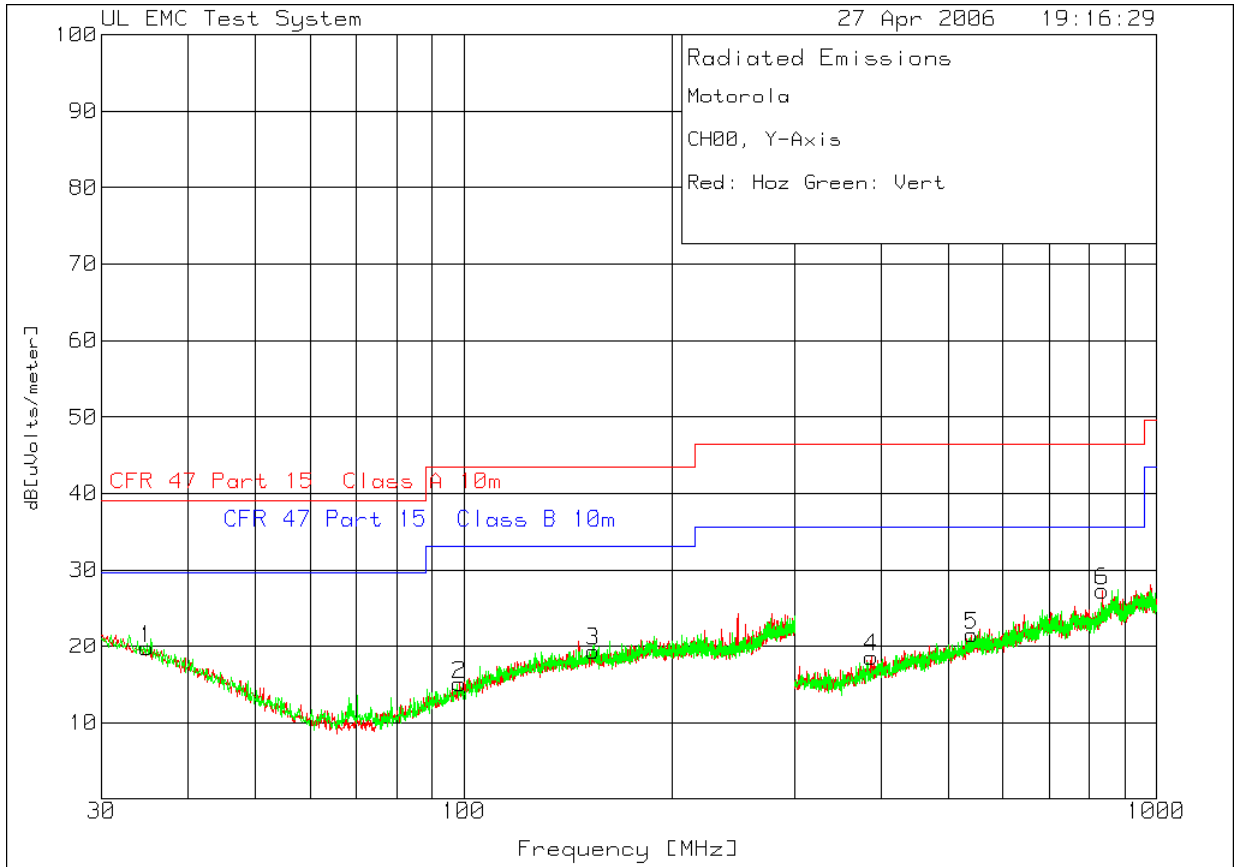
A fully charged battery was used for the supply voltage.

*Testing was performed by Underwriters Laboratories Inc. Please refer to page 3.*

**Measurement Results**

See attached

**Radiated Emissions  
CH 0 2402 MHz Y-Axis**



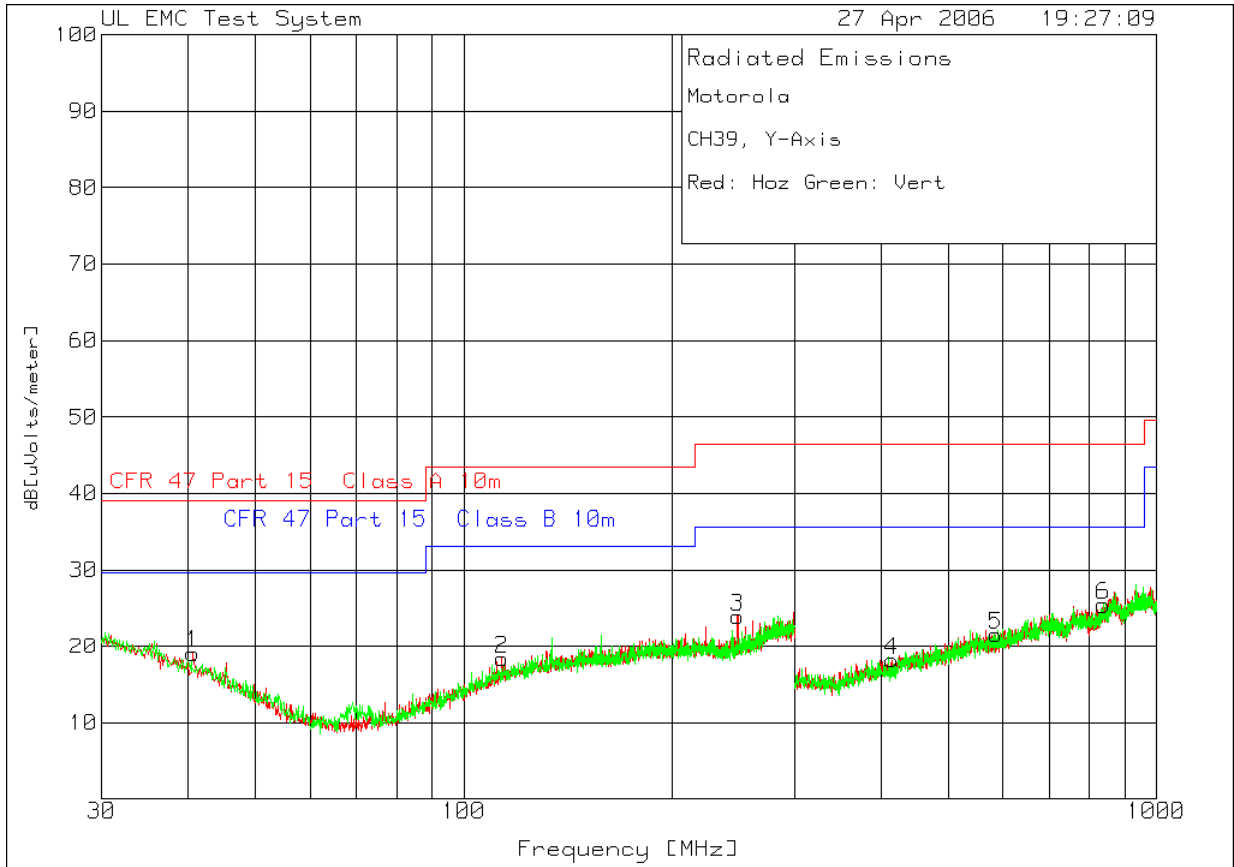
Motorola  
CH00, Y-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 [dB]	Margin 1 [dB]	Limit 2 [dB]	Margin 2 [dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz													
1	34.8576	34.2	pk	-30.8	16.4	19.8	39.1	-19.3	29.6	-9.8	68	100	Horz
2	98.6806	35.2	pk	-30.5	10.4	15.1	43.5	-28.4	33.1	-18	136	100	Horz
3	153.868	34.8	pk	-30.4	15	19.4	43.5	-24.1	33.1	-13.7	316	100	Horz
Range 3 300 - 1000MHz													
4	387.4563	36	pk	-32.9	15.5	18.6	46.4	-27.8	35.6	-17	12	100	Horz
5	541.3793	34.8	pk	-32	18.7	21.5	46.4	-24.9	35.6	-14.1	354	100	Horz
6	834.8826	36.7	pk	-31.8	22.4	27.3	46.4	-19.1	35.6	-8.3	182	100	Horz

LIMIT 1: CFR 47 Part 15 Class A 10m  
LIMIT 2: CFR 47 Part 15 Class B 10m

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector

**Radiated Emissions  
CH 39 2442 MHz Y-Axis**



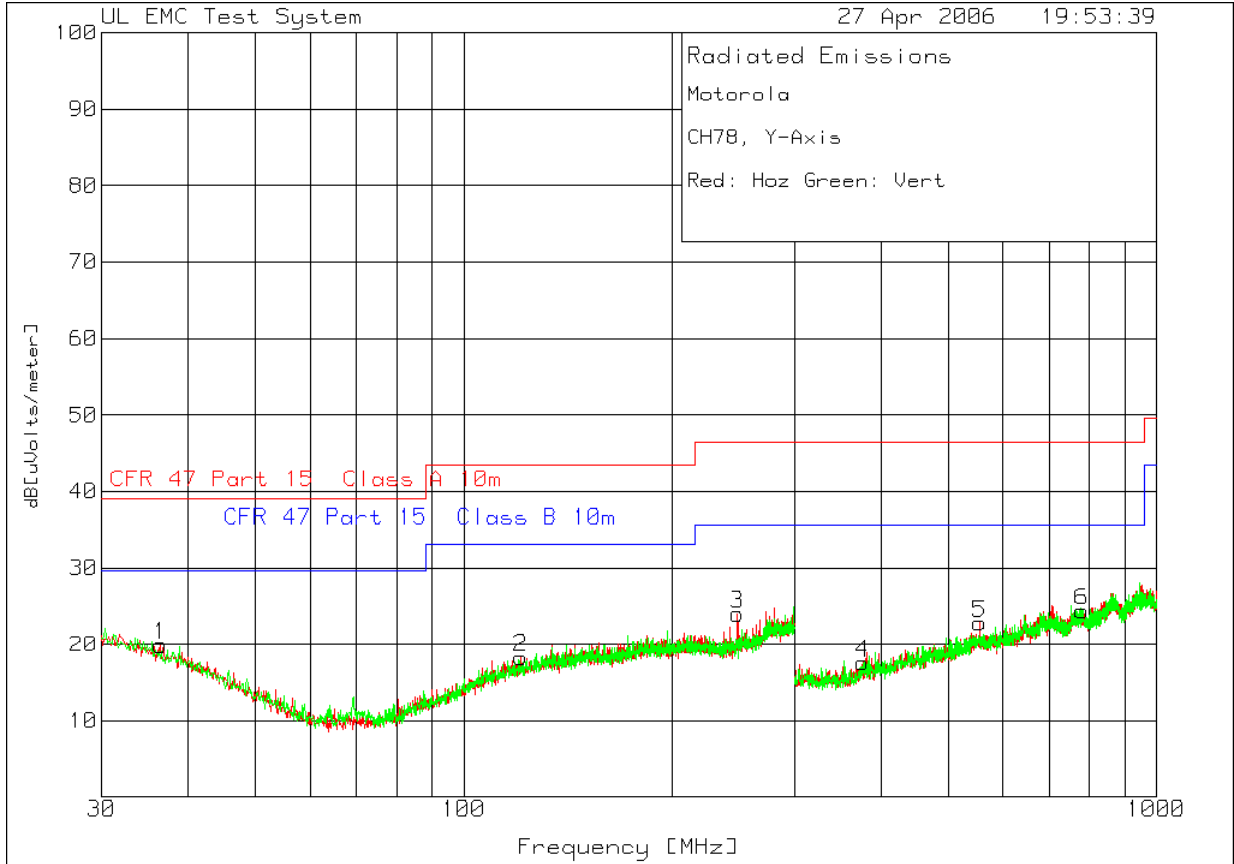
Motorola  
CH39, Y-Axis  
Red: Hoz Green: Vert

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1 [dB]	Limit 2	Margin 2 [dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz													
1	40.6597	35.8	pk	-30.7	14	19.1	39.1	-20	29.6	-10.5	102	100	Horz
2	113.5232	36.2	pk	-30.4	12.6	18.4	43.5	-25.1	33.1	-14.7	170	100	Horz
3	248.5232	37.9	pk	-29.9	15.9	23.9	46.4	-22.5	35.6	-11.7	170	100	Horz
Range 3 300 - 1000MHz													
4	415.0925	35	pk	-32.8	16	18.2	46.4	-28.2	35.6	-17.4	11	100	Horz
5	586.1569	34.6	pk	-31.8	18.7	21.5	46.4	-24.9	35.6	-14.1	25	100	Horz
6	837.6812	34.7	pk	-31.7	22.4	25.4	46.4	-21	35.6	-10.2	171	100	Horz

LIMIT 1: CFR 47 Part 15 Class A 10m  
LIMIT 2: CFR 47 Part 15 Class B 10m

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions  
CH 78 2480 MHz Y-Axis**



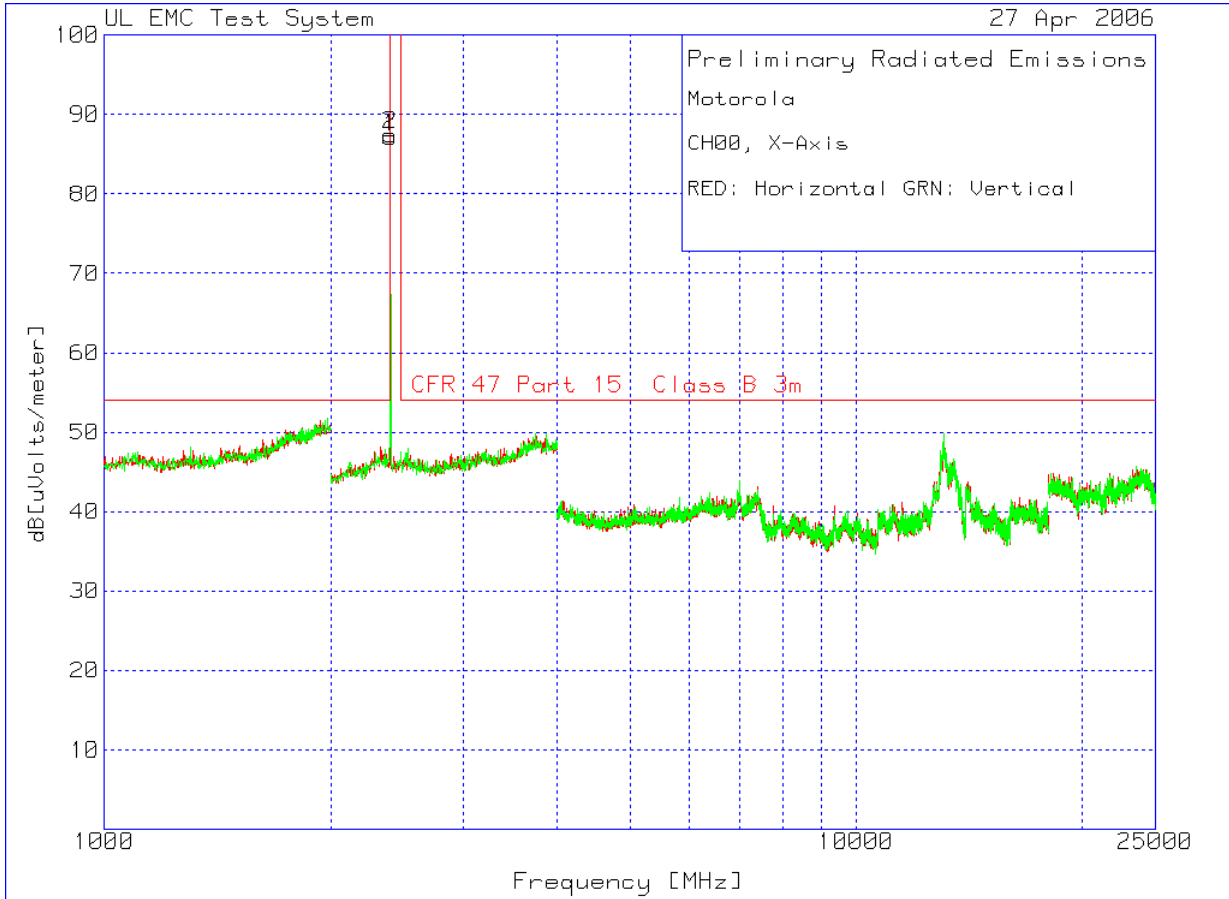
Motorola  
CH78, Y-Axis  
Red: Hoz Green: Vert

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 [dB]	Margin 1 [dB]	Limit 2 [dB]	Margin 2 [dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz													
1	36.4768	34.9 pk		-30.7	15.7	19.9	39.1	-19.2	29.6	-9.7	304	100	Horz
2	120.9445	35.4 pk		-30.4	13.3	18.3	43.5	-25.2	33.1	-14.8	304	100	Horz
3	248.4557	38 pk		-29.9	15.9	24	46.4	-22.4	35.6	-11.6	12	100	Horz
Range 3 300 - 1000MHz													
4	376.6117	35 pk		-32.8	15.4	17.6	46.4	-28.8	35.6	-18	148	100	Horz
5	555.0225	35.9 pk		-32	18.9	22.8	46.4	-23.6	35.6	-12.8	58	100	Horz
6	780.6597	34.4 pk		-31.6	21.6	24.4	46.4	-22	35.6	-11.2	216	100	Horz

LIMIT 1: CFR 47 Part 15 Class A 10m  
LIMIT 2: CFR 47 Part 15 Class B 10m

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions  
CH 0 2402 MHz X-Axis**



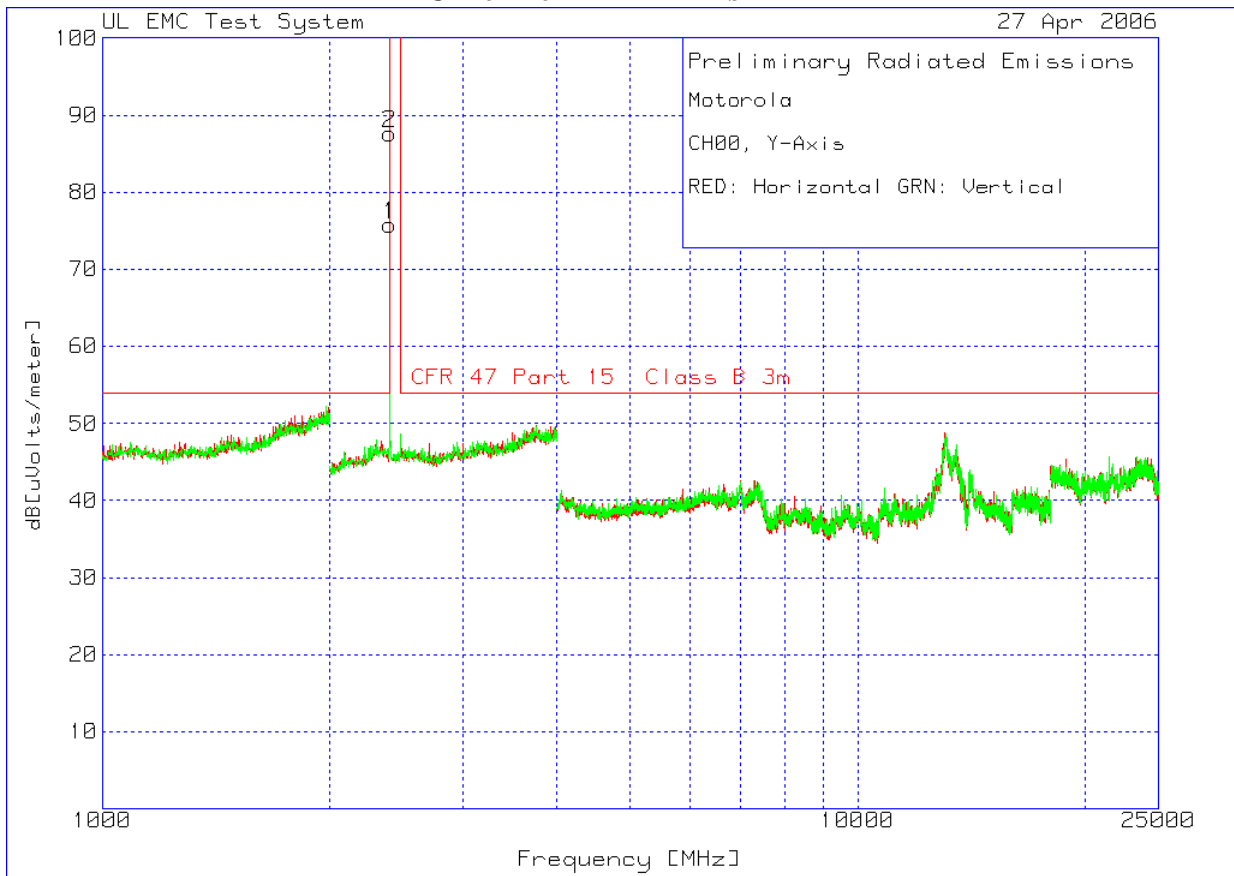
Motorola  
CH00, X-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2400.802	60.95	pk	4.4	21.8	87.15	999	-911.85	150	Horz
2	2400.802	61.23	pk	4.4	21.8	87.43	999	-911.57	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector

**Radiated Emissions  
CH 0 2402MHz Y-Axis**



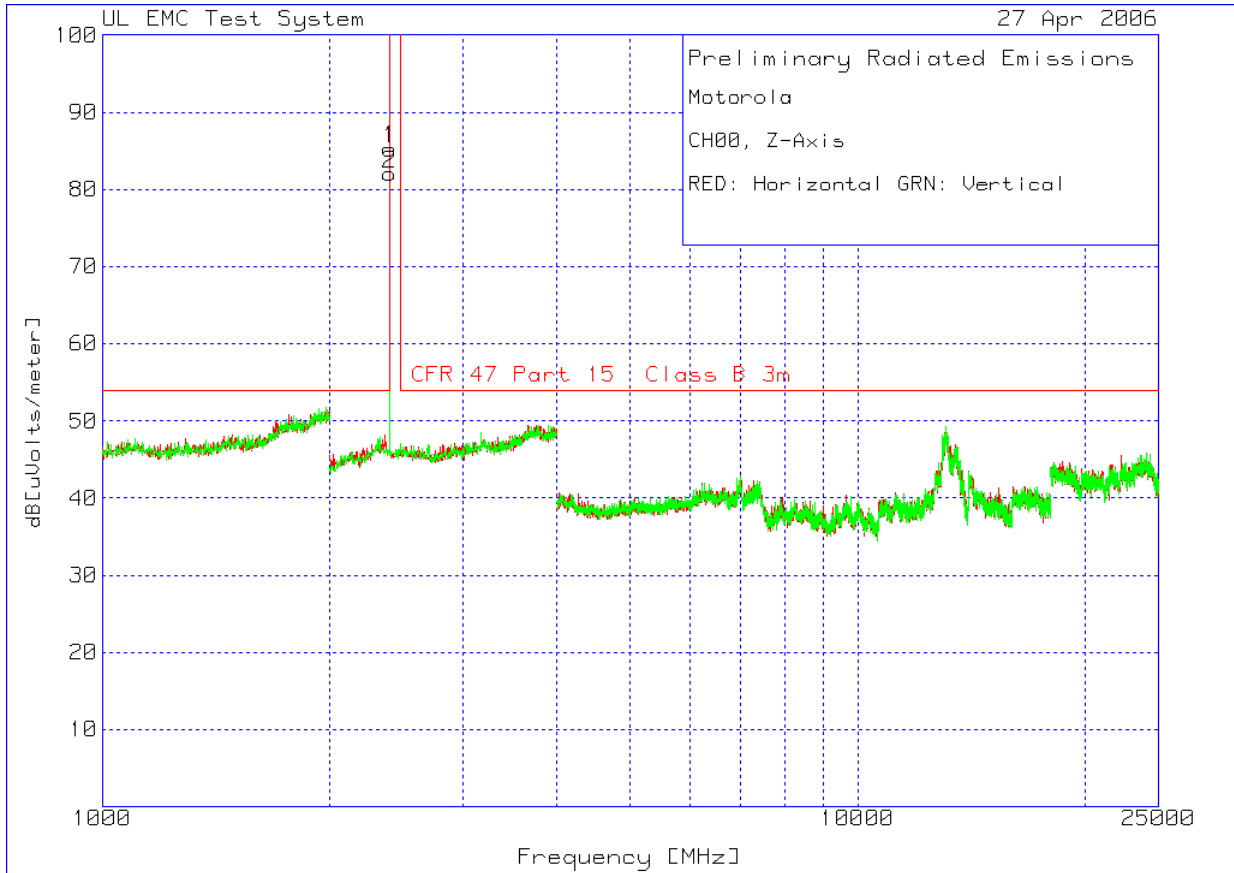
Motorola  
CH00, Y-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2400.802	49.56	pk	4.4	21.8	75.76	999	-923.24	99	Horz
2	2400.802	61.43	pk	4.4	21.8	87.63	999	-911.37	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector  
 qp - Quasi-Peak detector  
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 avlg - Average log detector  
 ave - Average detector

**Radiated Emissions  
CH 0 2402 MHz Z-Axis**



Motorola

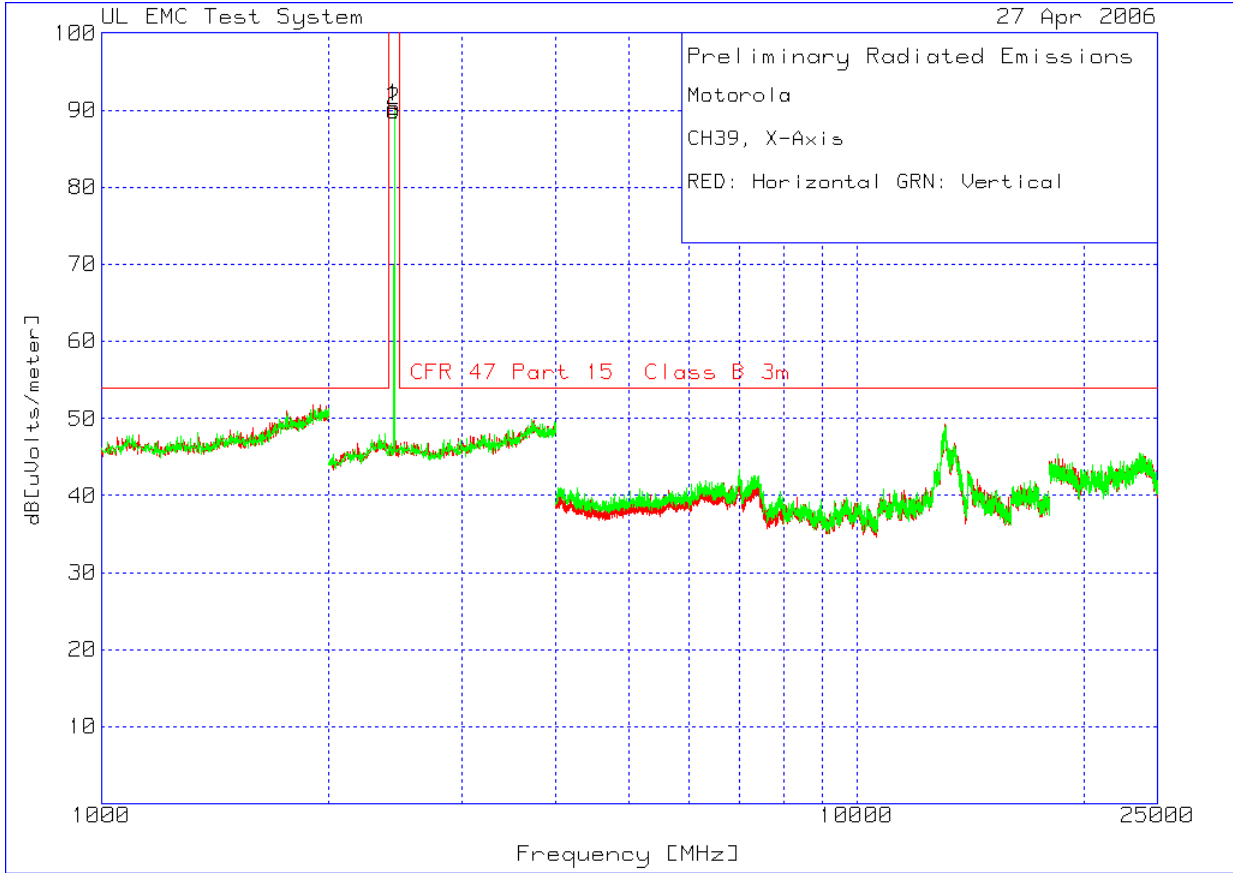
CH00, Z-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2400.802	59.04	pk	4.4	21.8	85.24	999	-913.76	149	Horz
2	2400.802	55.83	pk	4.4	21.8	82.03	999	-916.97	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector

**Radiated Emissions  
CH 39 2441 MHz X-Axis**



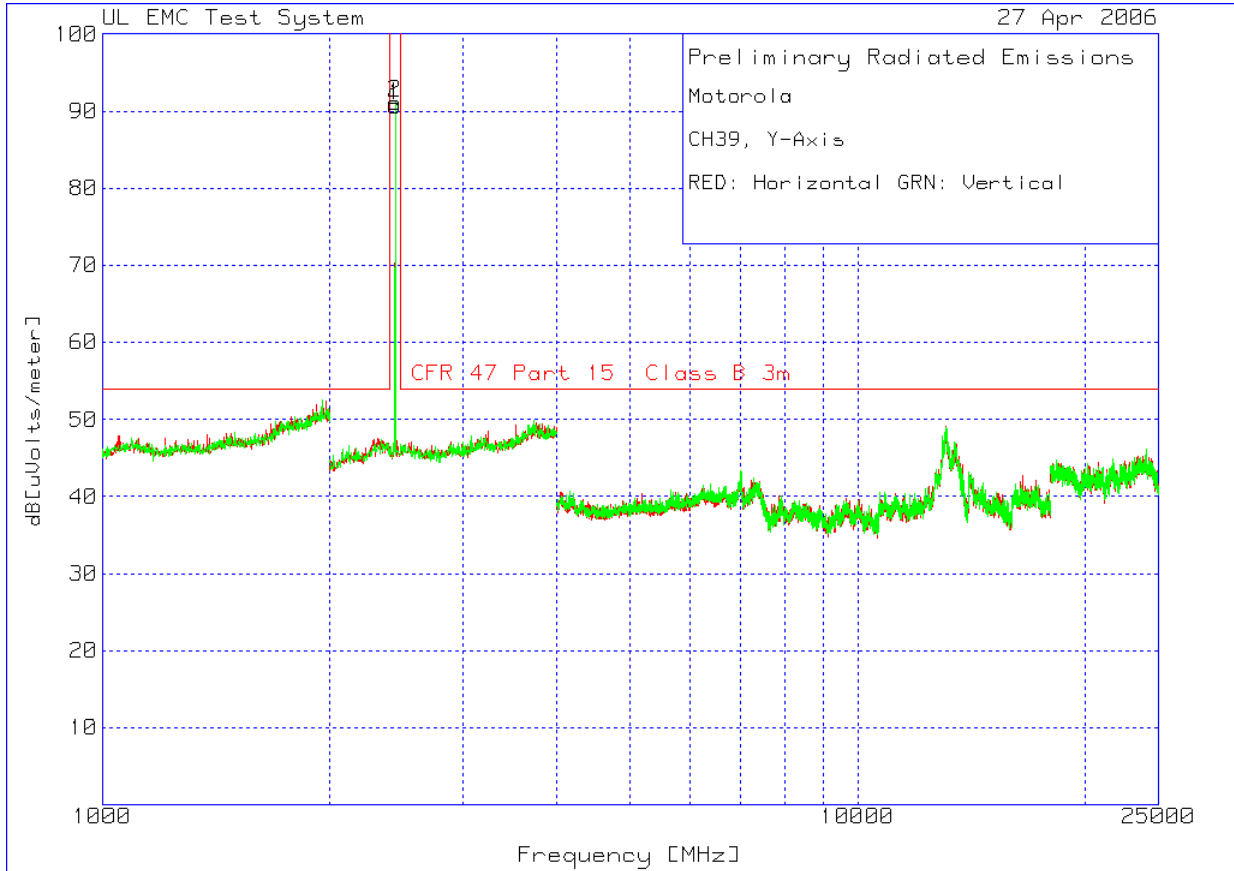
Motorola  
CH39, X-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2440.882	64.25	pk	4.2	21.9	90.35	999	-908.65	99	Horz
2	2440.882	63.85	pk	4.2	21.9	89.95	999	-909.05	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector

**Radiated Emissions  
CH 39 2441 MHz Y-Axis**



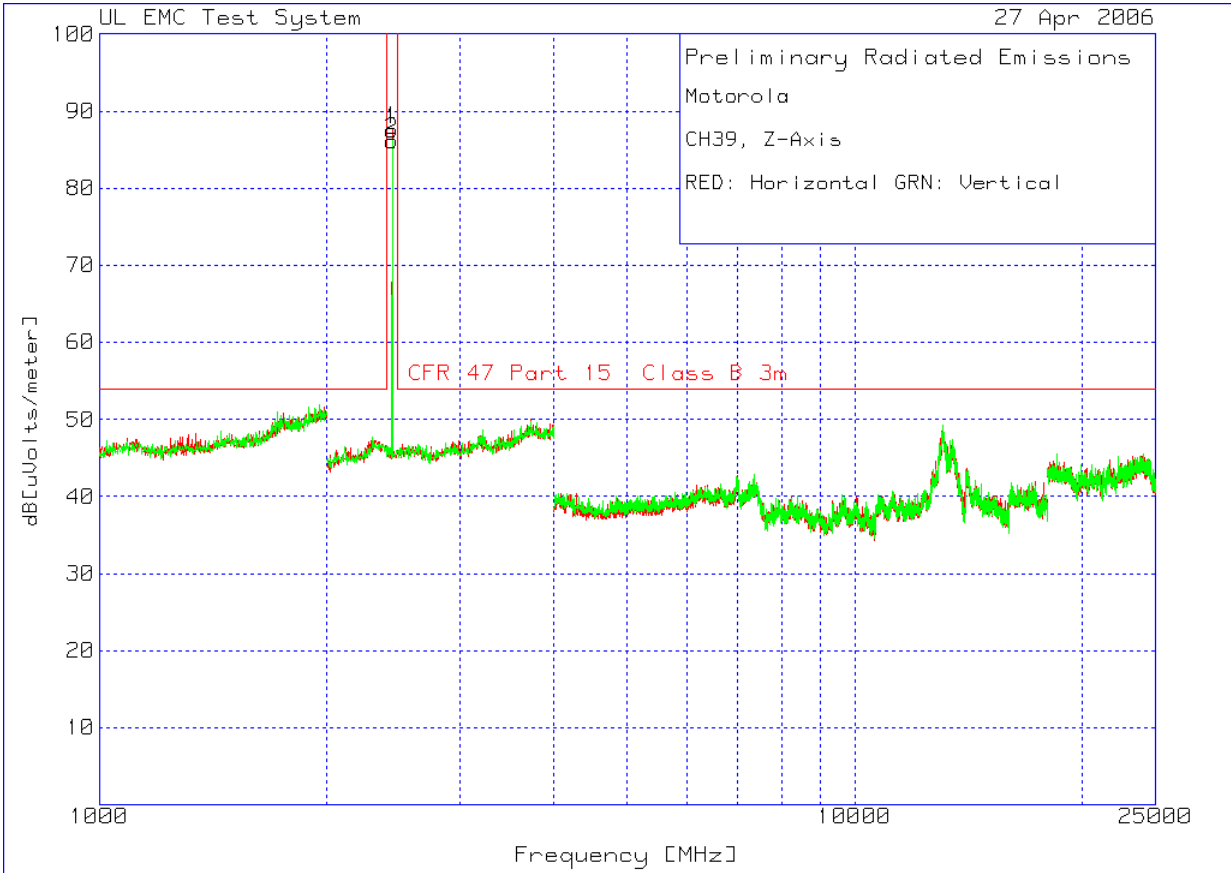
Motorola  
CH39, Y-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2440.882	64.63	pk	4.2	21.9	90.73	999	-908.27	99	Horz
2	2440.882	65	pk	4.2	21.9	91.1	999	-907.9	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector  
 qp - Quasi-Peak detector  
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 avlg - Average log detector  
 ave - Average detector

**Radiated Emissions  
CH 39 2441 MHz Z-Axis**



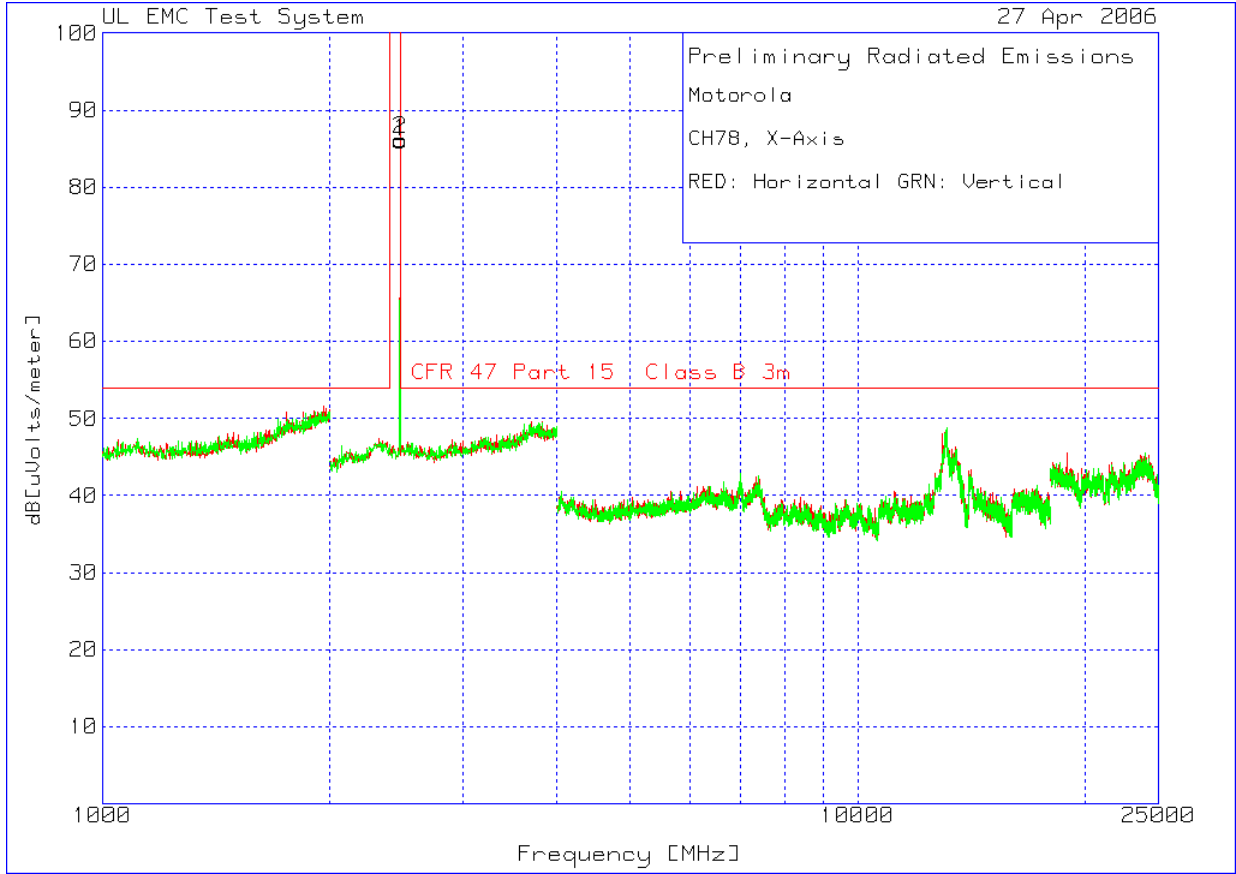
Motorola  
CH39, Z-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dBuV/m]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2440.882	61.48	pk	4.2	21.9	87.58	999	-911.42	99	Horz
2	2440.882	60.08	pk	4.2	21.9	86.18	999	-912.82	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector

**Radiated Emissions  
CH 78 2480 MHz X-Axis**



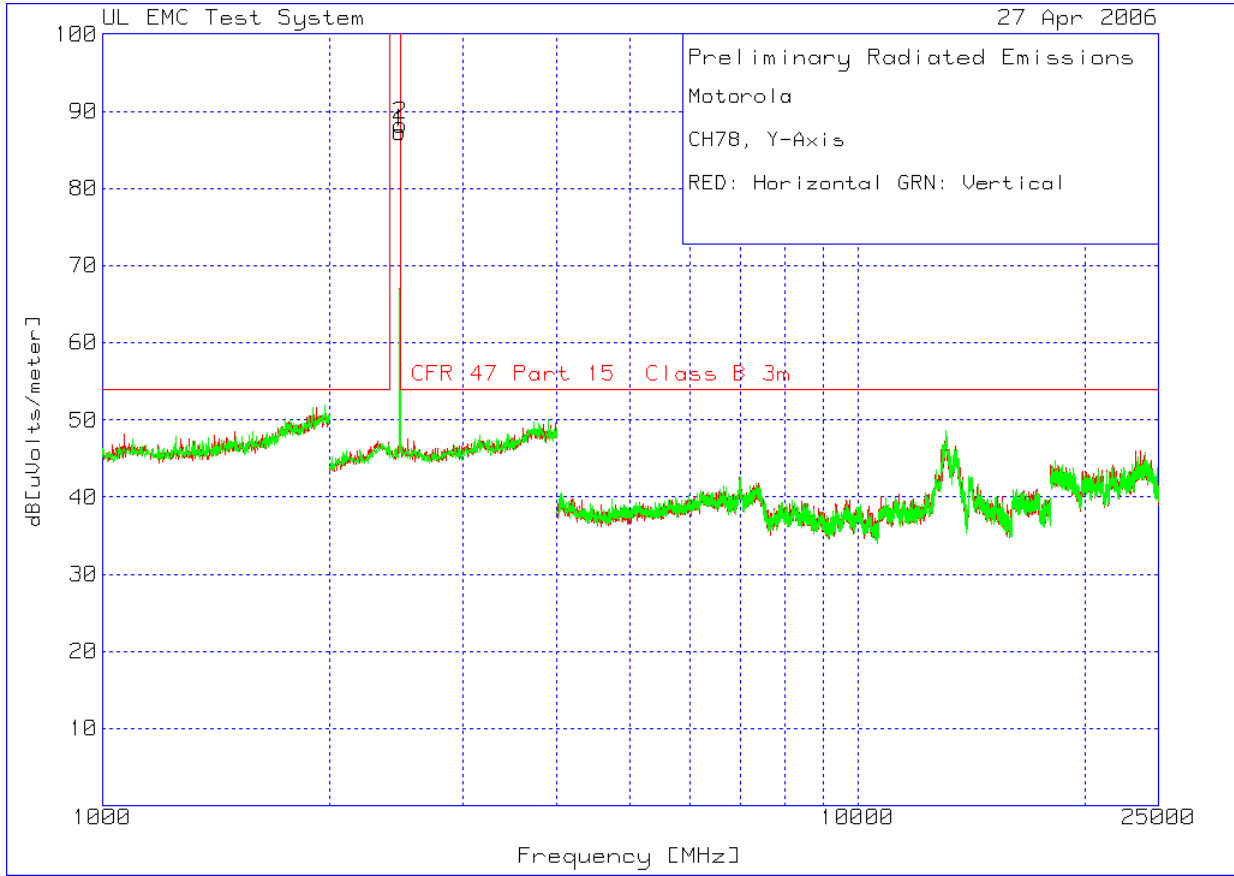
Motorola  
CH78, X-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2480.962	59.87	pk	4.1	22	85.97	999	-913.03	150	Horz
2	2480.962	60.07	pk	4.1	22	86.17	999	-912.83	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
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- ave - Average detector

**Radiated Emissions  
CH 78 2480 MHz Y-Axis**



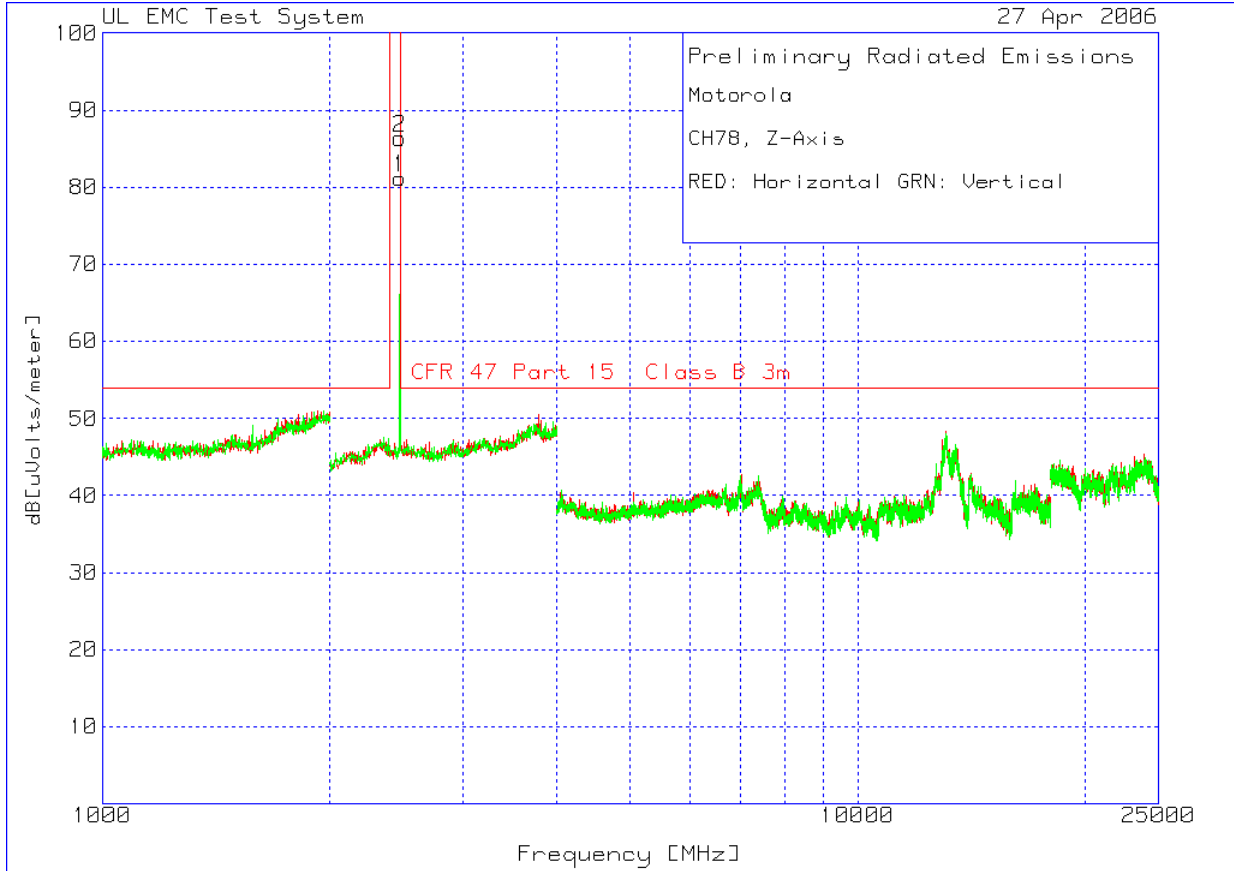
Motorola  
CH78, Y-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2476.954	61.19	pk	4.1	22	87.29	999	-911.71	150	Horz
2	2480.962	62.13	pk	4.1	22	88.23	999	-910.77	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

- pk - Peak detector
- qp - Quasi-Peak detector
- av - Average detector
- avlg - Average log detector
- ave - Average detector

**Radiated Emissions  
CH 78 2480 MHz Z-Axis**



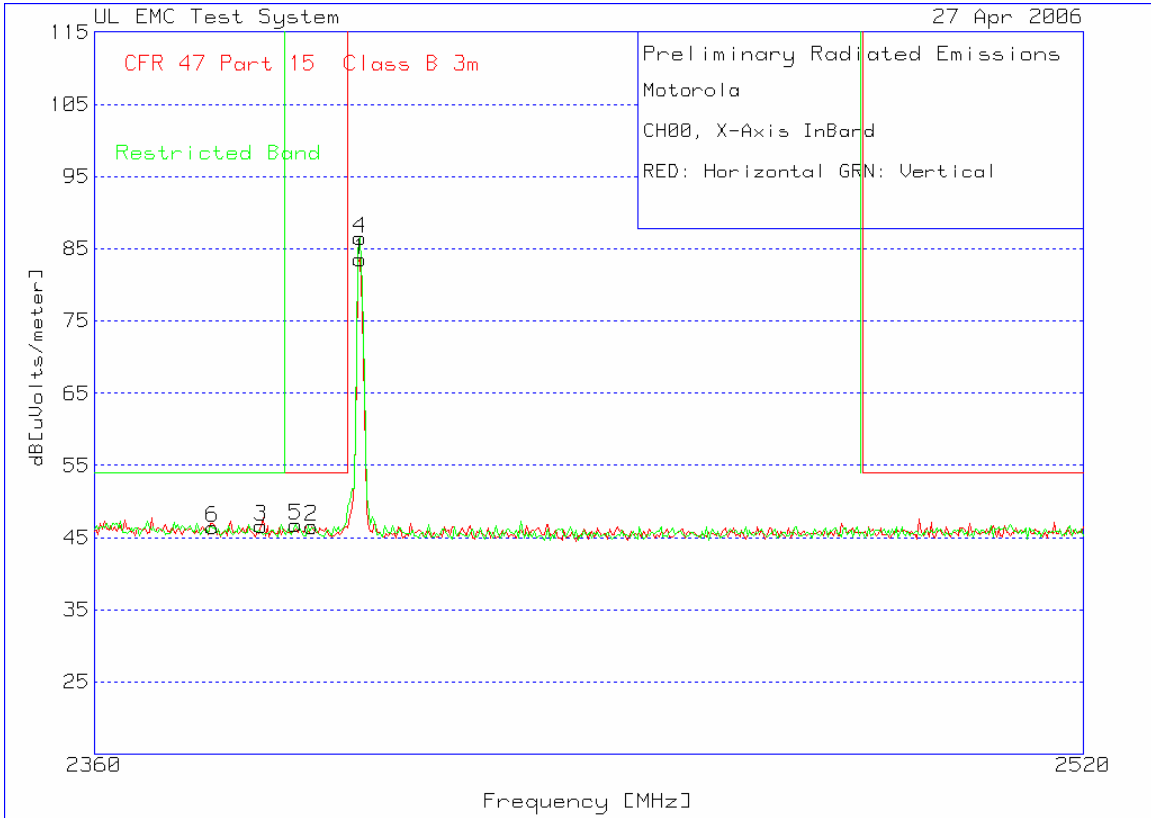
Motorola  
CH78, Z-Axis

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dBuV/m]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1	2476.954	55.09	pk	4.1	22	81.19	999	-917.81	150	Horz
2	2476.954	60.29	pk	4.1	22	86.39	999	-912.61	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

**Radiated Emissions Band Edge  
CH 0 2402 MHz X-Axis**



Motorola  
CH00, X-Axis InBand

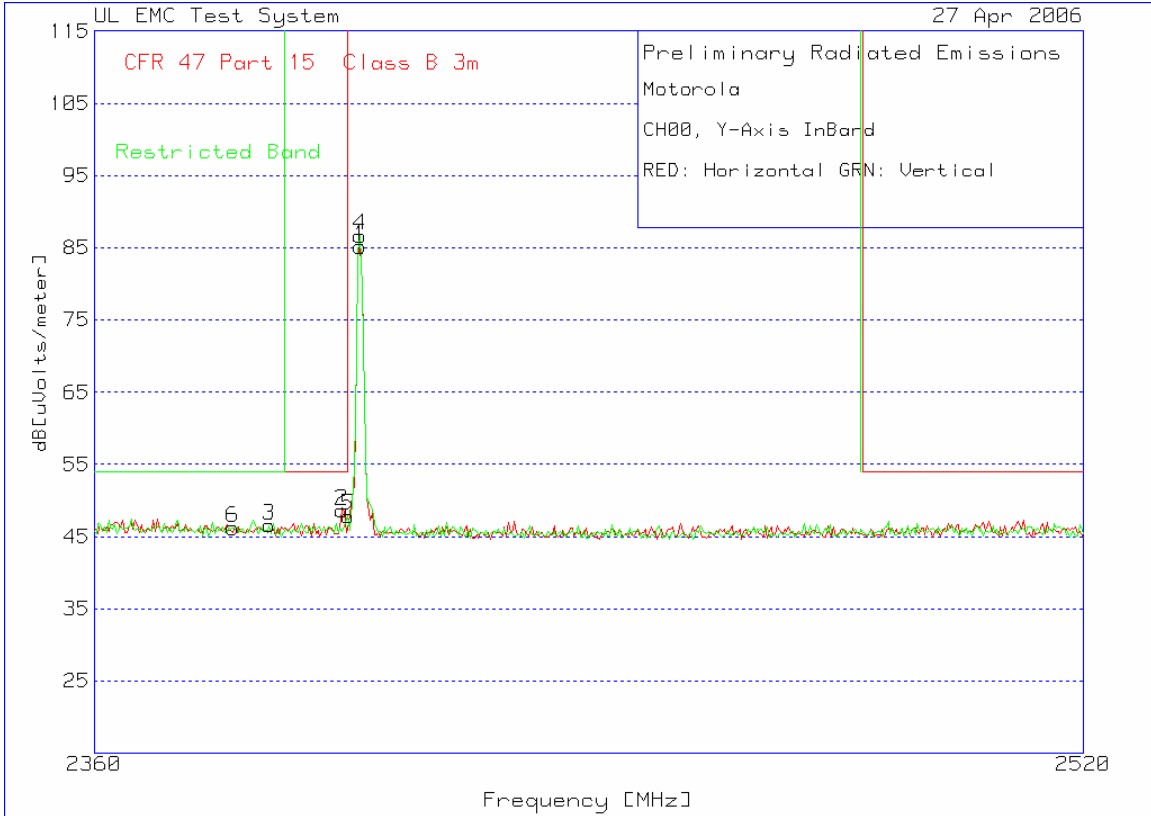
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2402.004	57.32	pk	4.4	21.8	83.52	999	-915.48	999	-915.48	150	Horz
2	2394.309	20.31	pk	4.4	21.8	46.51	54	-7.49	999	-952.49	99	Horz
3	2386.293	20.37	pk	4.4	21.8	46.57	54	-7.43	54	-7.43	150	Horz
4	2402.004	60.26	pk	4.4	21.8	86.46	999	-912.54	999	-912.54	149	Vert
5	2391.743	20.52	pk	4.4	21.8	46.72	54	-7.28	999	-952.28	149	Vert
6	2378.597	20.2	pk	4.4	21.8	46.4	54	-7.6	54	-7.6	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

LIMIT 2: Restricted Band

pk - Peak detector  
 qp - Quasi-Peak detector  
 av - Average detector  
 avlg - Average log detector  
 ave - Average detector

**Radiated Emissions Band Edge  
CH 0 2402 MHz Y-Axis**



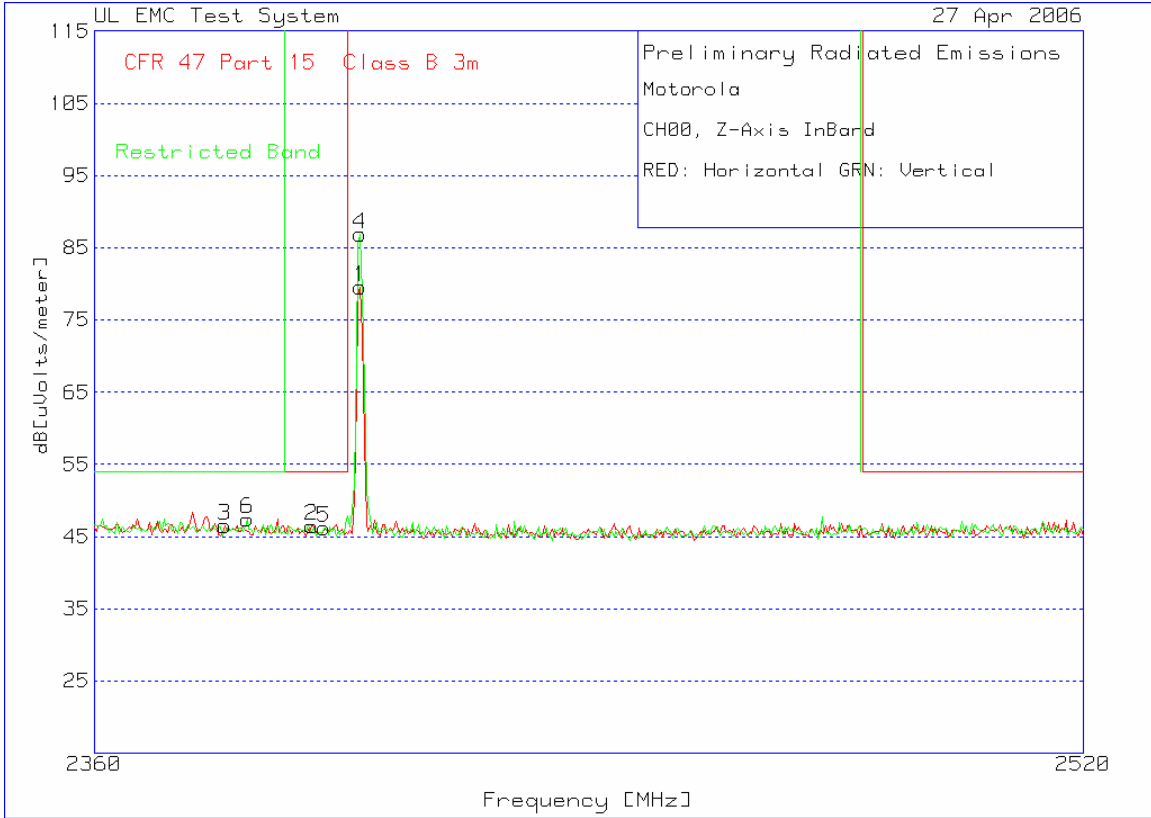
Motorola  
CH00, Y-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2402.004	58.97	pk	4.4	21.8	85.17	999	-913.83	999	-913.83	99	Horz
2	2399.118	22.4	pk	4.4	21.8	48.6	54	-5.4	999	-950.4	99	Horz
3	2387.575	20.35	pk	4.4	21.8	46.55	54	-7.45	54	-7.45	150	Horz
4	2402.004	60.45	pk	4.4	21.8	86.65	999	-912.35	999	-912.35	99	Vert
5	2400.08	21.66	pk	4.4	21.8	47.86	999	-951.14	999	-951.14	150	Vert
6	2381.804	20.01	pk	4.4	21.8	46.21	54	-7.79	54	-7.79	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions Band Edge  
CH 0 2402 MHz Z-Axis**



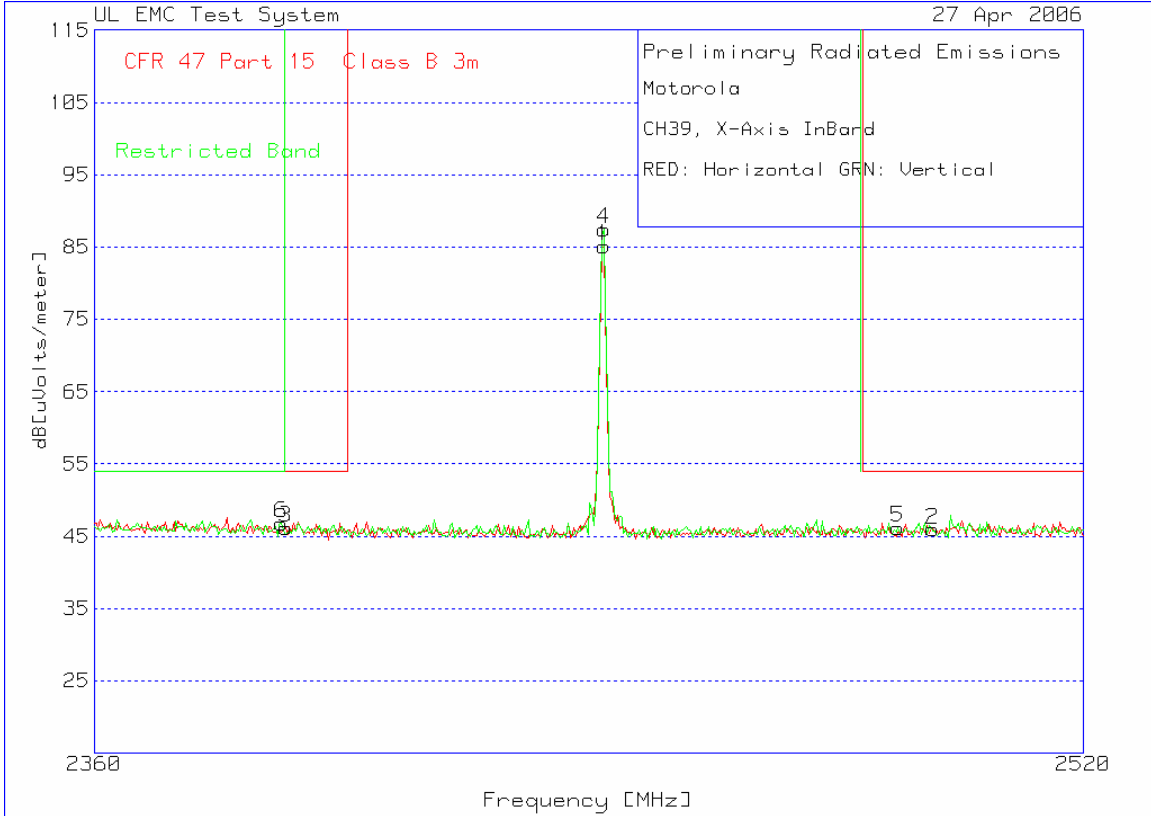
Motorola  
CH00, Z-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2402.004	53.36	pk	4.4	21.8	79.56	999	-919.44	999	-919.44	99	Horz
2	2394.309	20.25	pk	4.4	21.8	46.45	54	-7.55	999	-952.55	99	Horz
3	2380.521	20.3	pk	4.4	21.8	46.5	54	-7.5	54	-7.5	99	Horz
4	2402.004	60.68	pk	4.4	21.8	86.88	999	-912.12	999	-912.12	99	Vert
5	2396.232	20.01	pk	4.4	21.8	46.21	54	-7.79	999	-952.79	150	Vert
6	2384.048	21.21	pk	4.4	21.8	47.41	54	-6.59	54	-6.59	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

### Radiated Emissions Band Edge CH 39 2442 MHz X-Axis



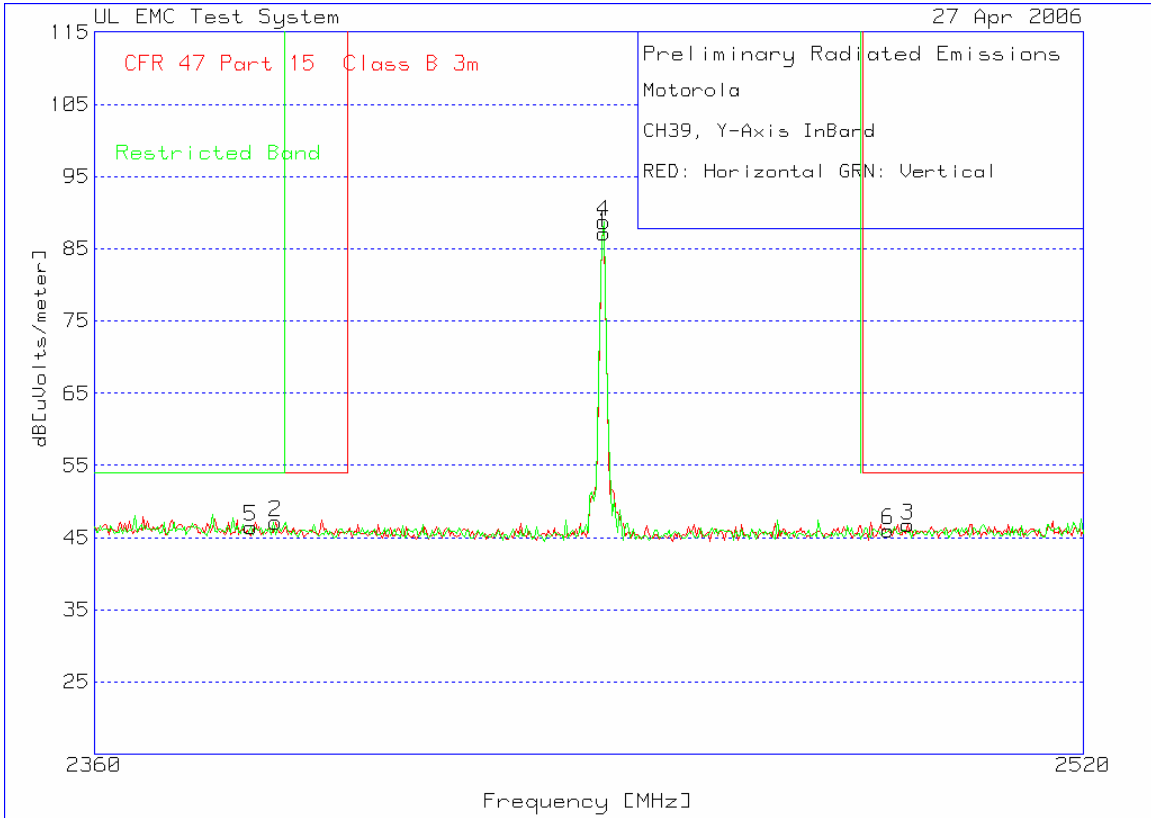
Motorola  
CH39, X-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2441.122	59.03	pk	4.2	21.9	85.13	999	-913.87	999	-913.87	150	Horz
2	2494.99	19.76	pk	4.1	22.1	45.96	54	-8.04	0	45.96	99	Horz
3	2390.14	19.94	pk	4.4	21.8	46.14	54	-7.86	999	-952.86	150	Horz
4	2441.122	61.34	pk	4.2	21.9	87.44	999	-911.56	999	-911.56	149	Vert
5	2489.218	19.96	pk	4.1	22.1	46.16	54	-7.84	0	46.16	149	Vert
6	2389.499	20.57	pk	4.4	21.8	46.77	54	-7.23	54	-7.23	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions Band Edge  
CH 39 2442 MHz Y-Axis**



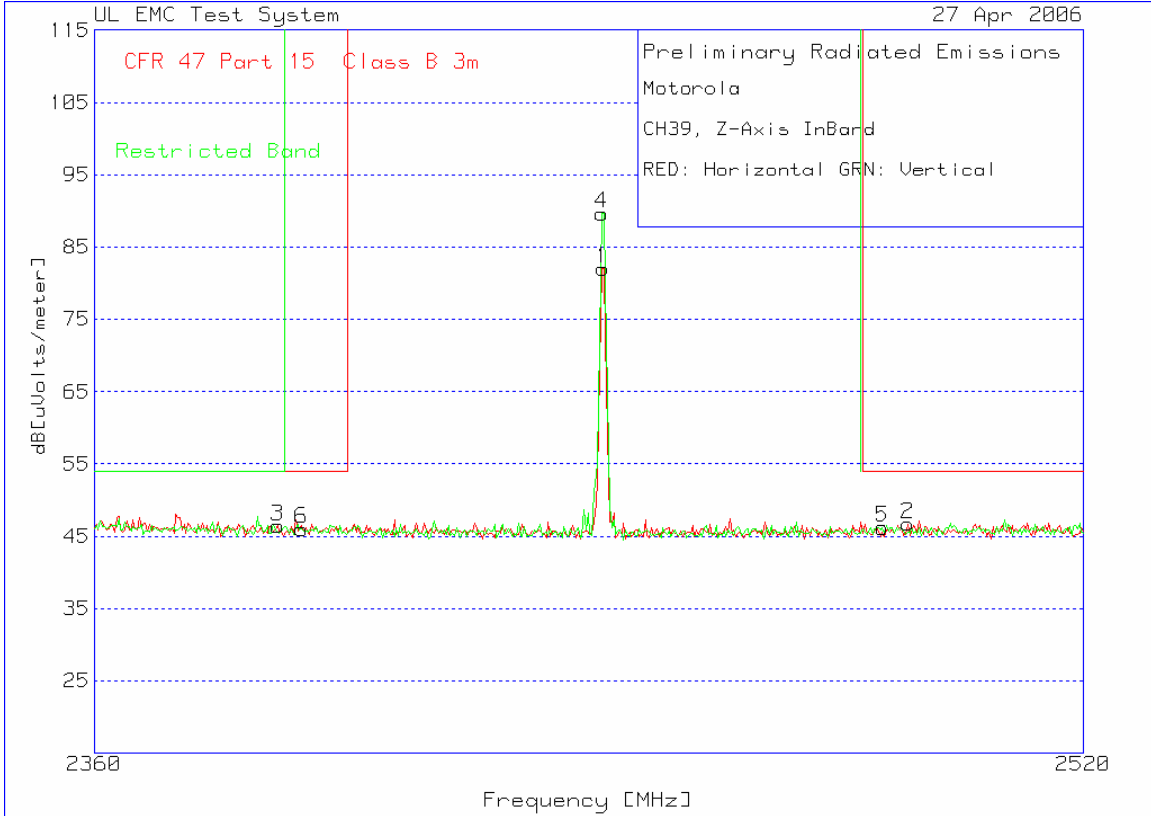
Motorola  
CH39, Y-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2441.122	61.05	pk	4.2	21.9	87.15	999	-911.85	999	-911.85	149	Horz
2	2388.537	20.93	pk	4.4	21.8	47.13	54	-6.87	54	-6.87	149	Horz
3	2490.822	20.53	pk	4.1	22.1	46.73	54	-7.27	0	46.73	149	Horz
4	2441.122	62.64	pk	4.2	21.9	88.74	999	-910.26	999	-910.26	99	Vert
5	2384.689	20.24	pk	4.4	21.8	46.44	54	-7.56	54	-7.56	99	Vert
6	2487.615	19.8	pk	4.1	22.1	46	54	-8	0	46	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

### Radiated Emissions Band Edge CH 39 2442 MHz Z-Axis



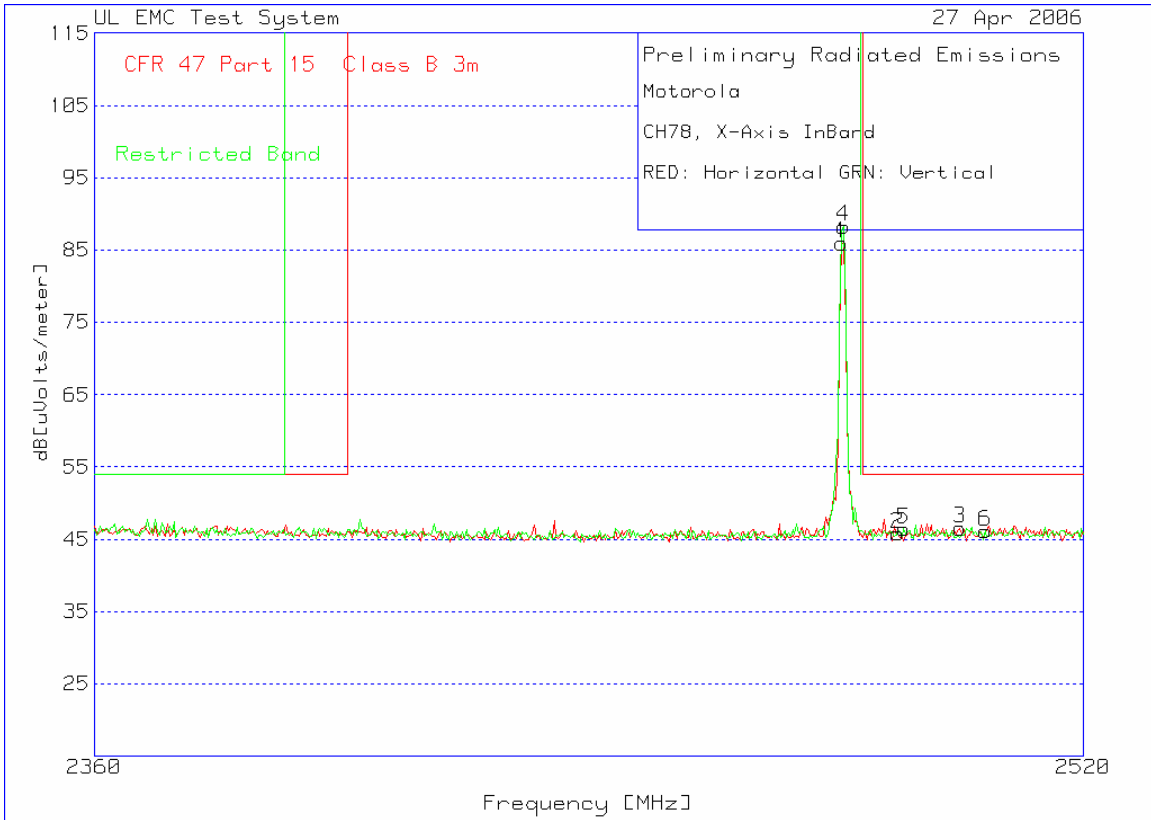
Motorola  
CH39, Z-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2440.962	55.91	pk	4.2	21.9	82.01	999	-916.99	999	-916.99	149	Horz
2	2490.822	20.51	pk	4.1	22.1	46.71	54	-7.29	0	46.71	149	Horz
3	2388.858	20.21	pk	4.4	21.8	46.41	54	-7.59	54	-7.59	149	Horz
4	2440.802	63.52	pk	4.2	21.9	89.62	999	-909.38	999	-909.38	99	Vert
5	2486.653	20.01	pk	4.1	22.1	46.21	54	-7.79	0	46.21	99	Vert
6	2392.705	19.78	pk	4.4	21.8	45.98	54	-8.02	999	-953.02	99	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions Band Edge  
CH 78 2480 MHz X-Axis**



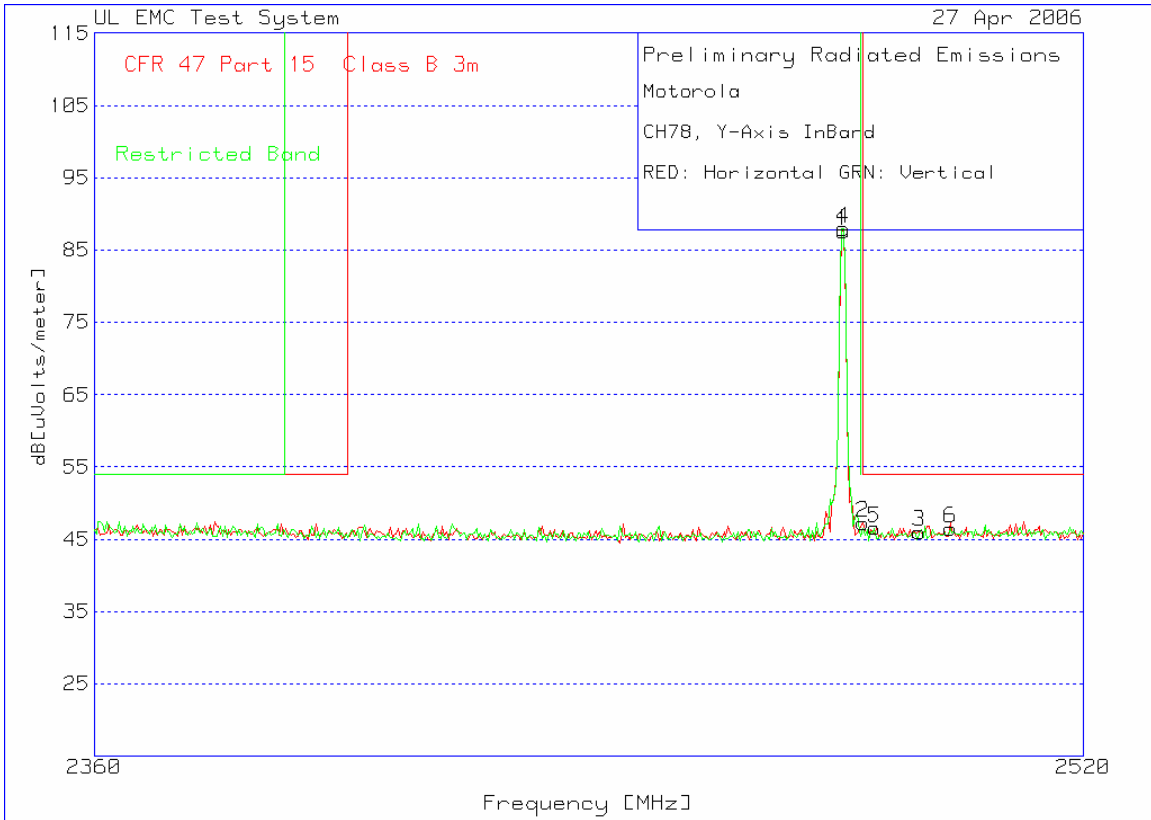
Motorola  
CH78, X-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2479.92	59.86	pk	4.1	22	85.96	999	-913.04	999	-913.04	150	Horz
2	2489.218	19.59	pk	4.1	22.1	45.79	54	-8.21	0	45.79	150	Horz
3	2499.479	20.3	pk	4.1	22.1	46.5	54	-7.5	0	46.5	150	Horz
4	2480.24	62.14	pk	4.1	22	88.24	999	-910.76	999	-910.76	150	Vert
5	2490.18	20.21	pk	4.1	22.1	46.41	54	-7.59	0	46.41	99	Vert
6	2503.647	19.91	pk	4.1	22.1	46.11	54	-7.89	0	46.11	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions Band Edge  
CH 78 2480MHz Y-Axis**



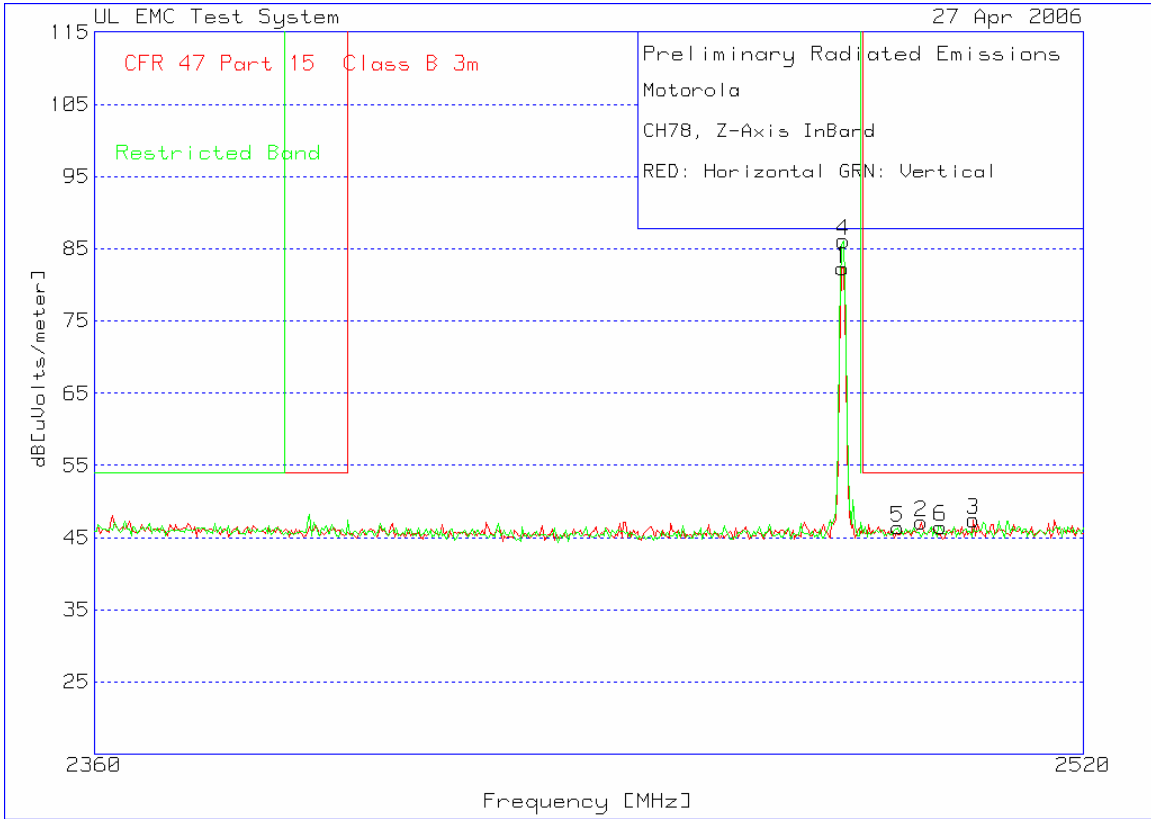
Motorola  
CH78, Y-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2480.24	61.49	pk	4.1	22	87.59	999	-911.41	999	-911.41	150	Horz
2	2483.447	21.06	pk	4.1	22.1	47.26	999	-951.74	0	47.26	150	Horz
3	2492.745	19.79	pk	4.1	22.1	45.99	54	-8.01	0	45.99	99	Horz
4	2480.24	61.85	pk	4.1	22	87.95	999	-911.05	999	-911.05	99	Vert
5	2485.371	20.36	pk	4.1	22.1	46.56	54	-7.44	0	46.56	150	Vert
6	2497.876	20.27	pk	4.1	22.1	46.47	54	-7.53	0	46.47	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**Radiated Emissions Band Edge  
CH 78 2480 MHz Z-Axis**



Motorola  
CH78, Z-Axis InBand

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dBuV/m	Limit 1 dBuV/m	Margin 1[dB]	Limit 2 dBuV/m	Margin 2[dB]	Height [cm]	Polarity
1	2480.08	56.18	pk	4.1	22	82.28	999	-916.72	999	-916.72	150	Horz
2	2493.066	20.92	pk	4.1	22.1	47.12	54	-6.88	0	47.12	99	Horz
3	2501.723	21.26	pk	4.1	22.1	47.46	54	-6.54	0	47.46	150	Horz
4	2480.24	59.98	pk	4.1	22	86.08	999	-912.92	999	-912.92	150	Vert
5	2489.218	20.18	pk	4.1	22.1	46.38	54	-7.62	0	46.38	150	Vert
6	2496.273	20.27	pk	4.1	22.1	46.47	54	-7.53	0	46.47	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m  
LIMIT 2: Restricted Band

pk - Peak detector  
qp - Quasi-Peak detector  
av - Average detector  
avlg - Average log detector  
ave - Average detector

**PEAK OUTPUT POWER**

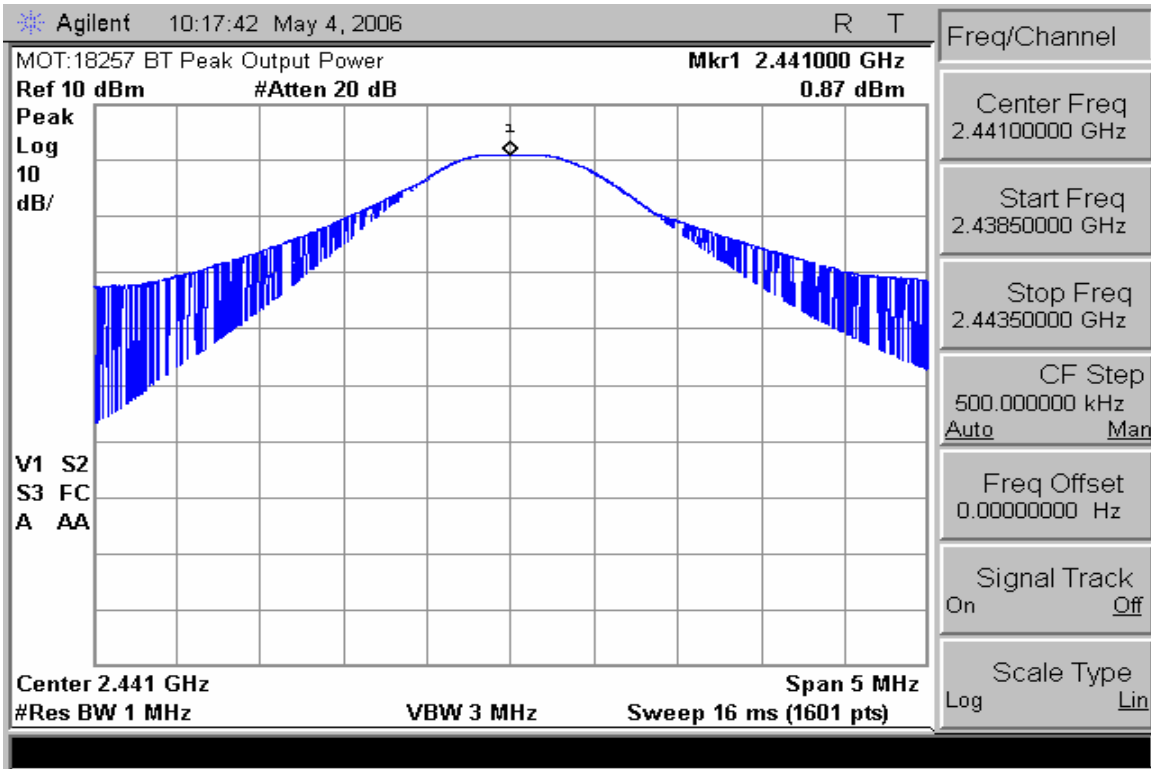
CFR 47 Part 15.247

**Measurement Procedure**

The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

**Measurement Results**

See Attached



**Peak Output Power**

## **BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS**

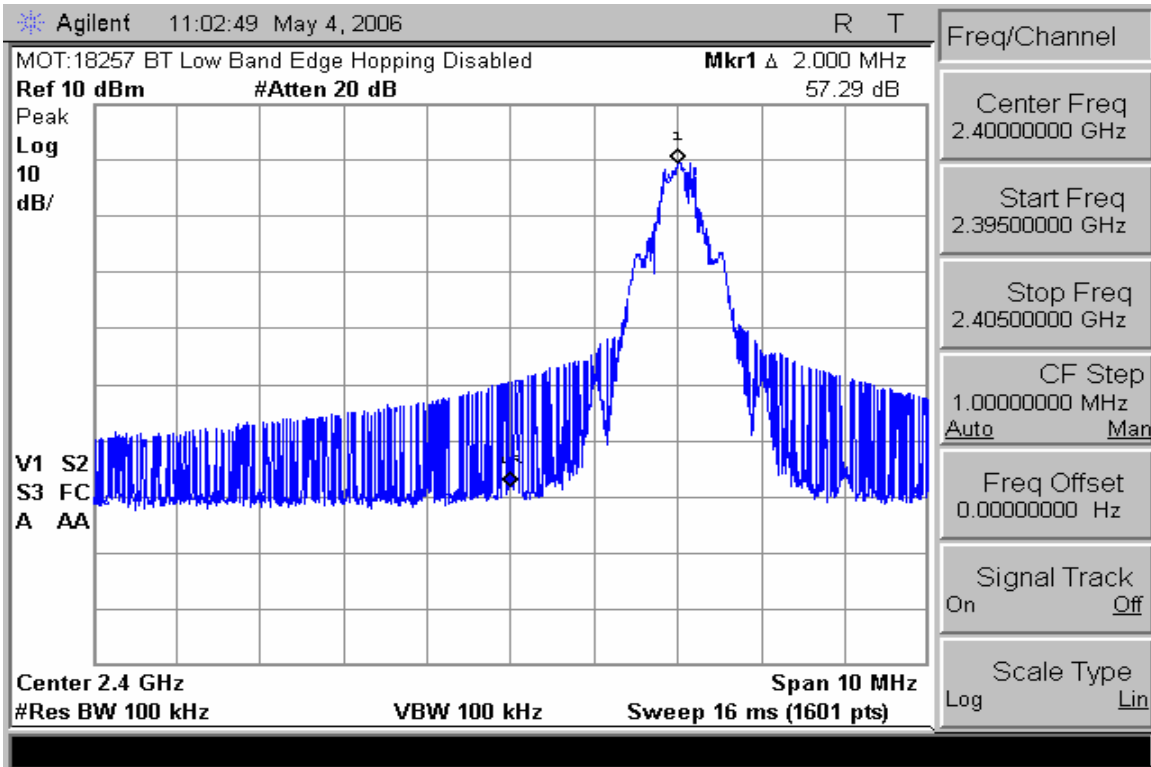
CFR 47 Part 15.247

### **Measurement Procedure**

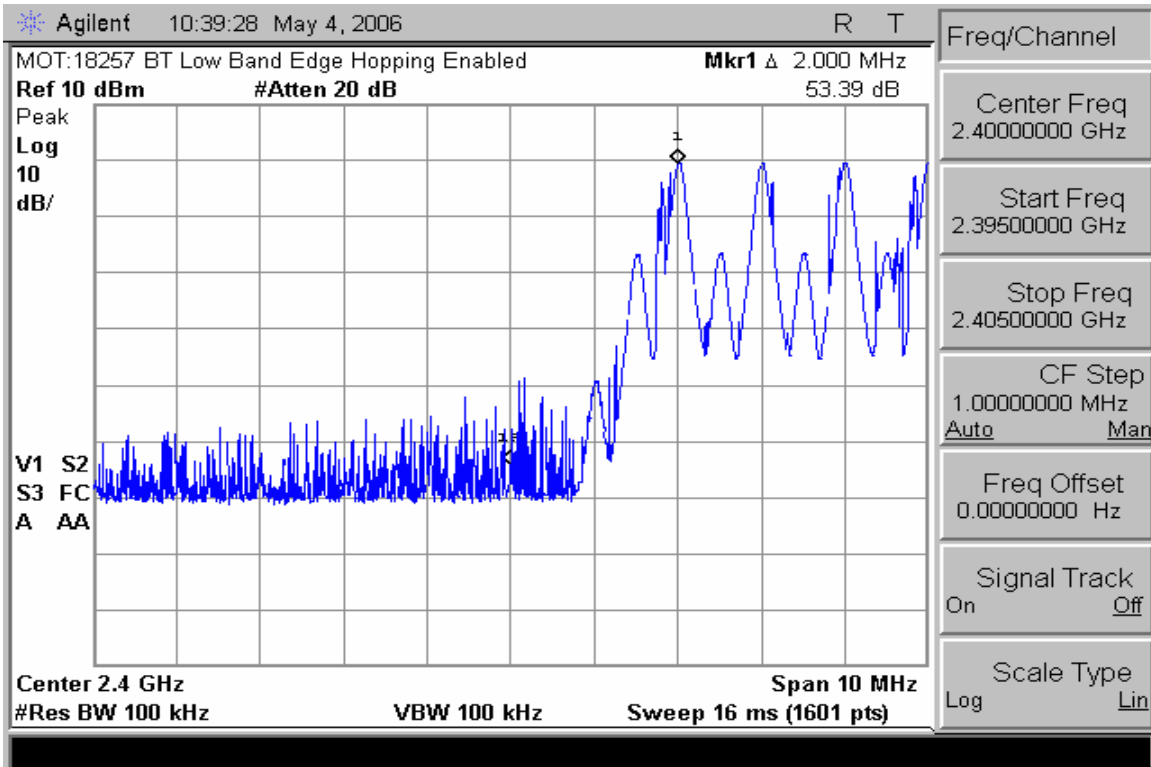
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

### **Measurement Results**

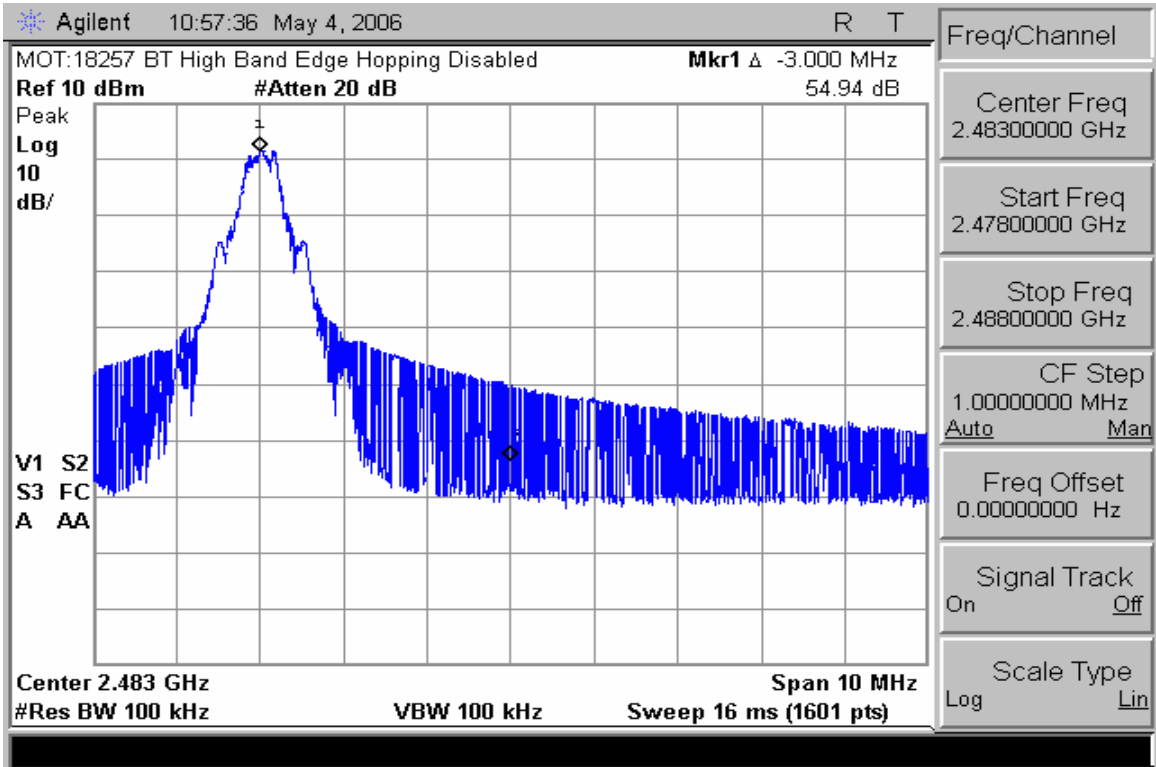
See Attached:



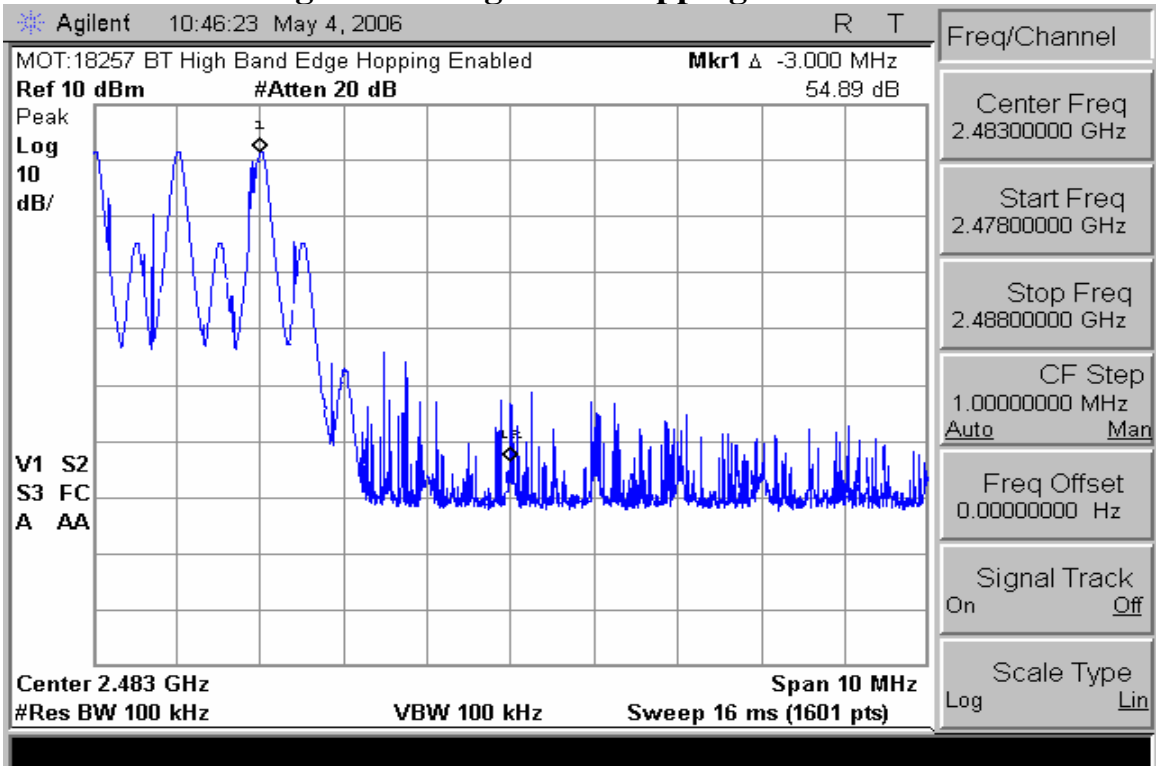
**Low Band Edge with Hopping Disabled**



**Low Band Edge with Hopping Enabled**



**High Band Edge with Hopping Disabled**



**High Band Edge with Hopping Enabled**

## **SPURIOUS RF CONDUCTED EMISSIONS**

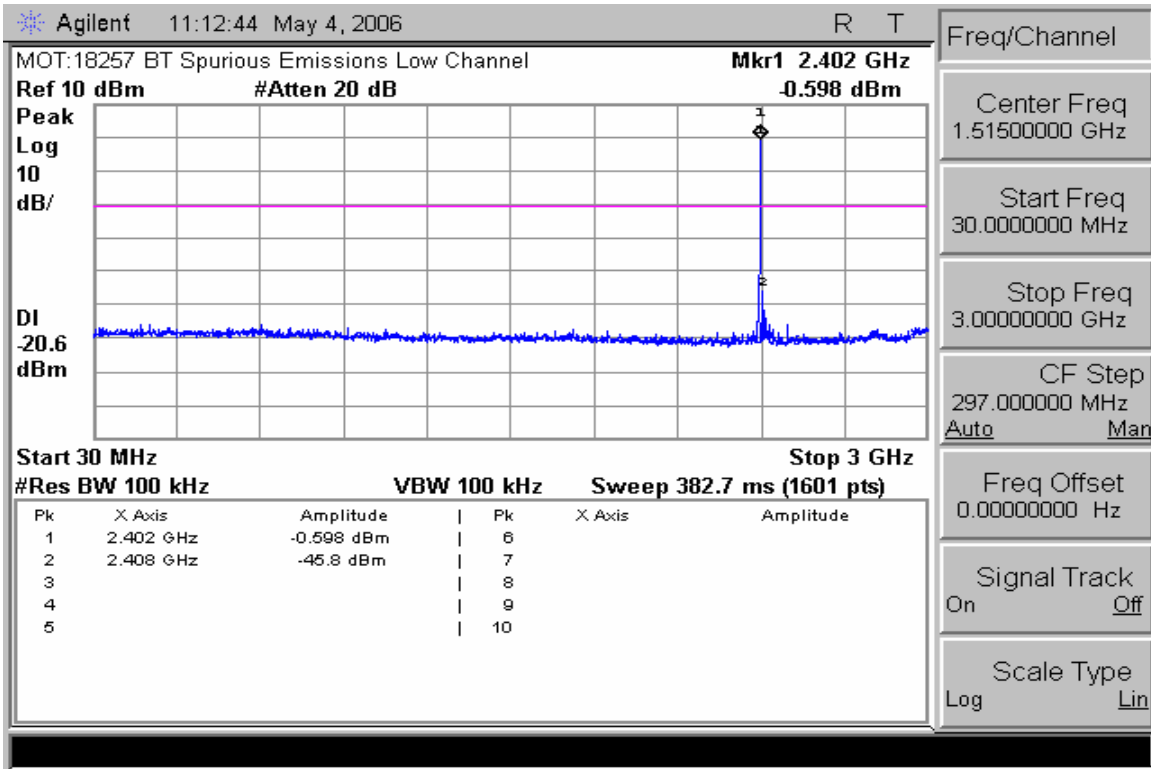
CFR 47 Part 15.247

### **Measurement Procedure**

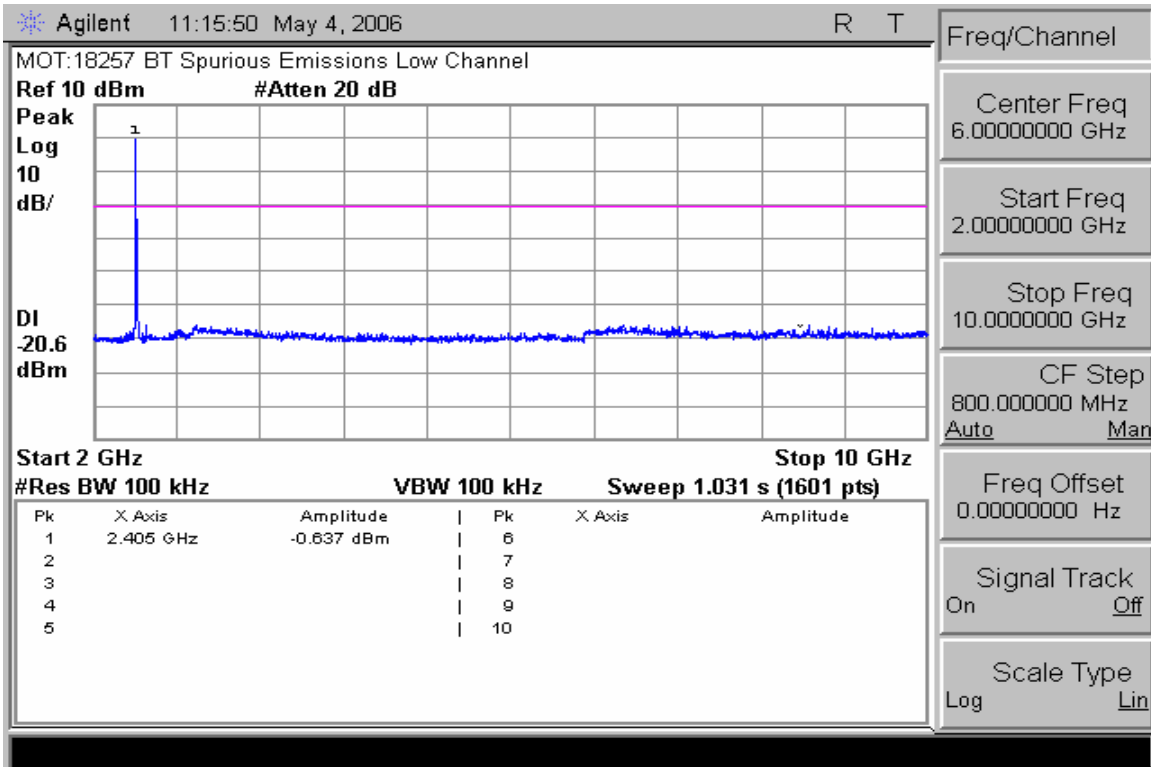
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

### **Measurement Results**

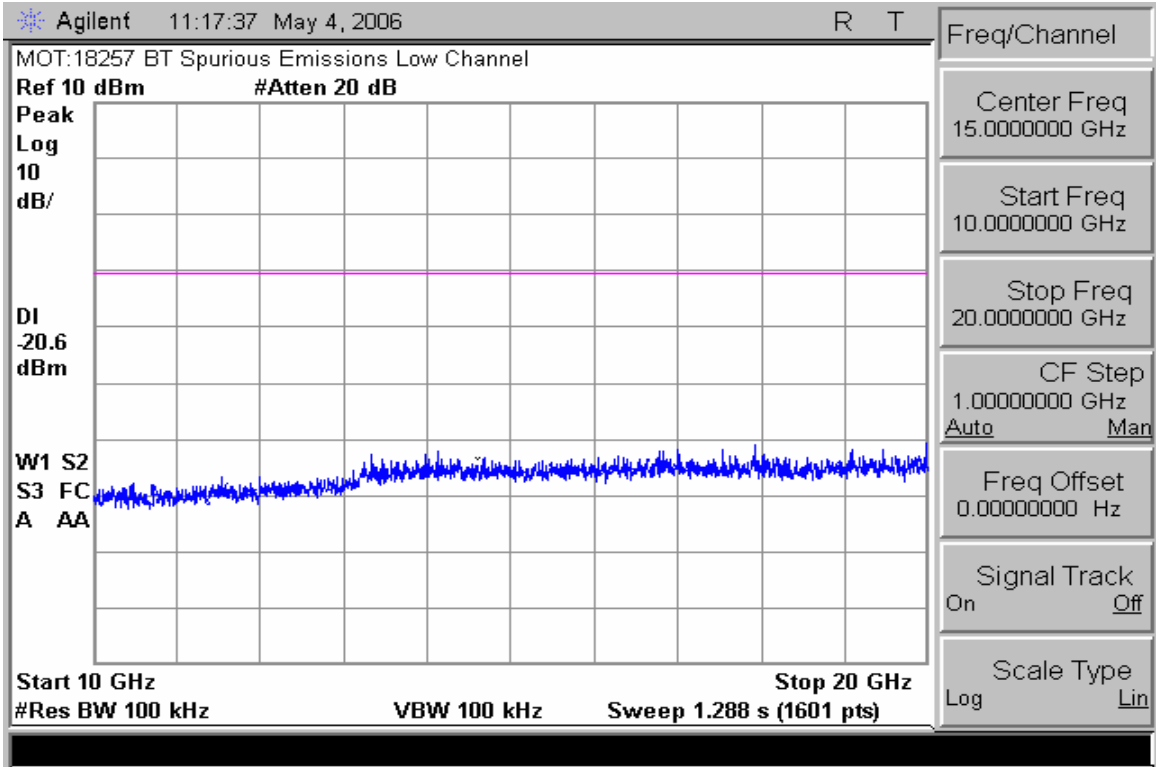
See attached:



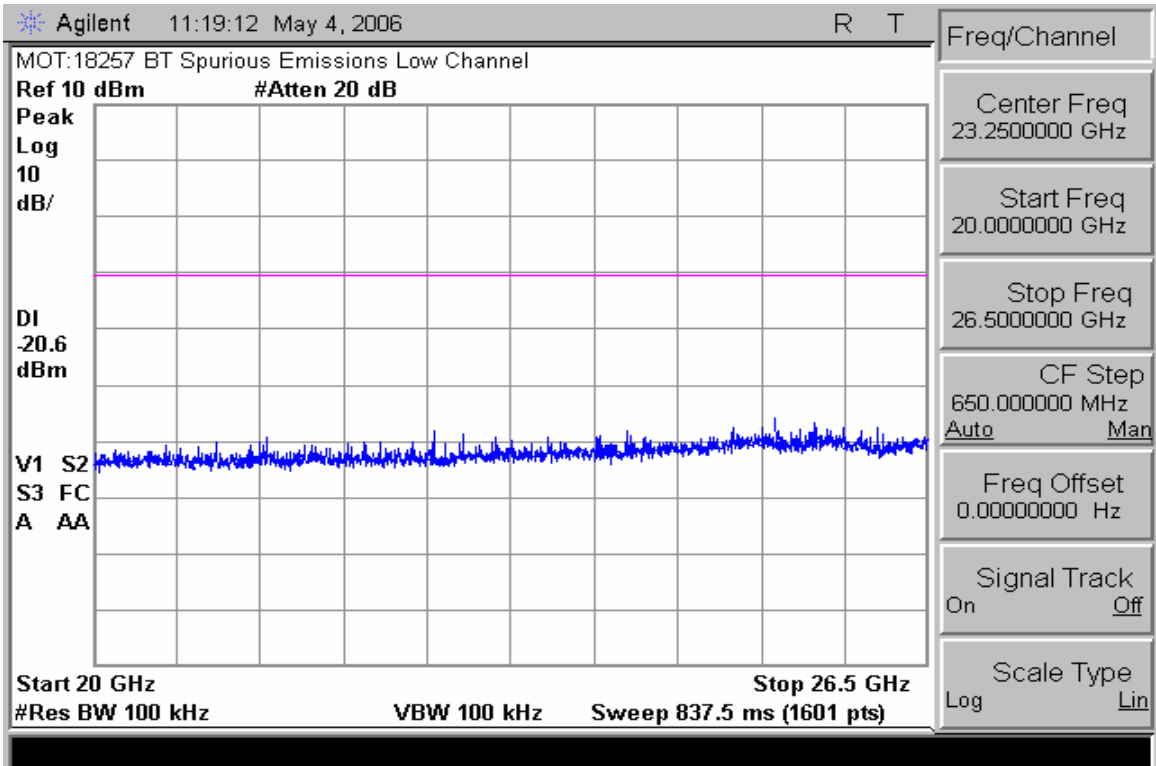
**Conducted Spurious Emissions 30-3000MHz (Low Channel)**



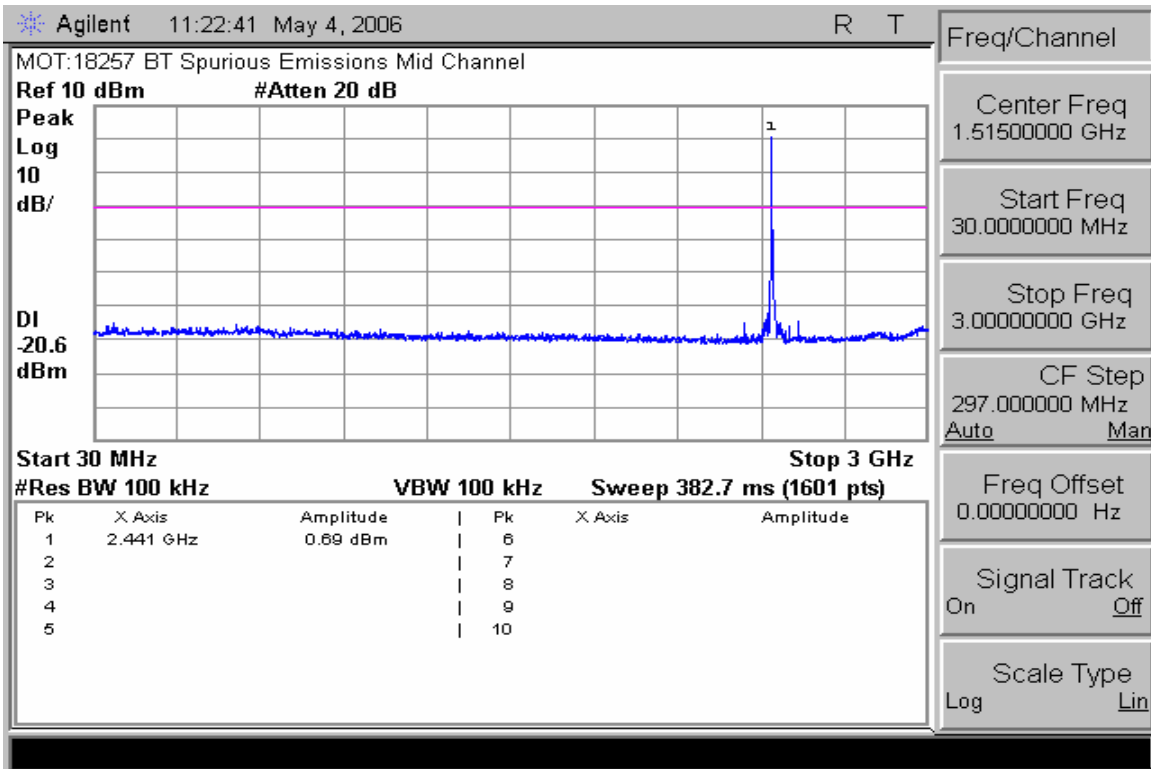
**Conducted Spurious Emissions 2-10GHz (Low Channel)**



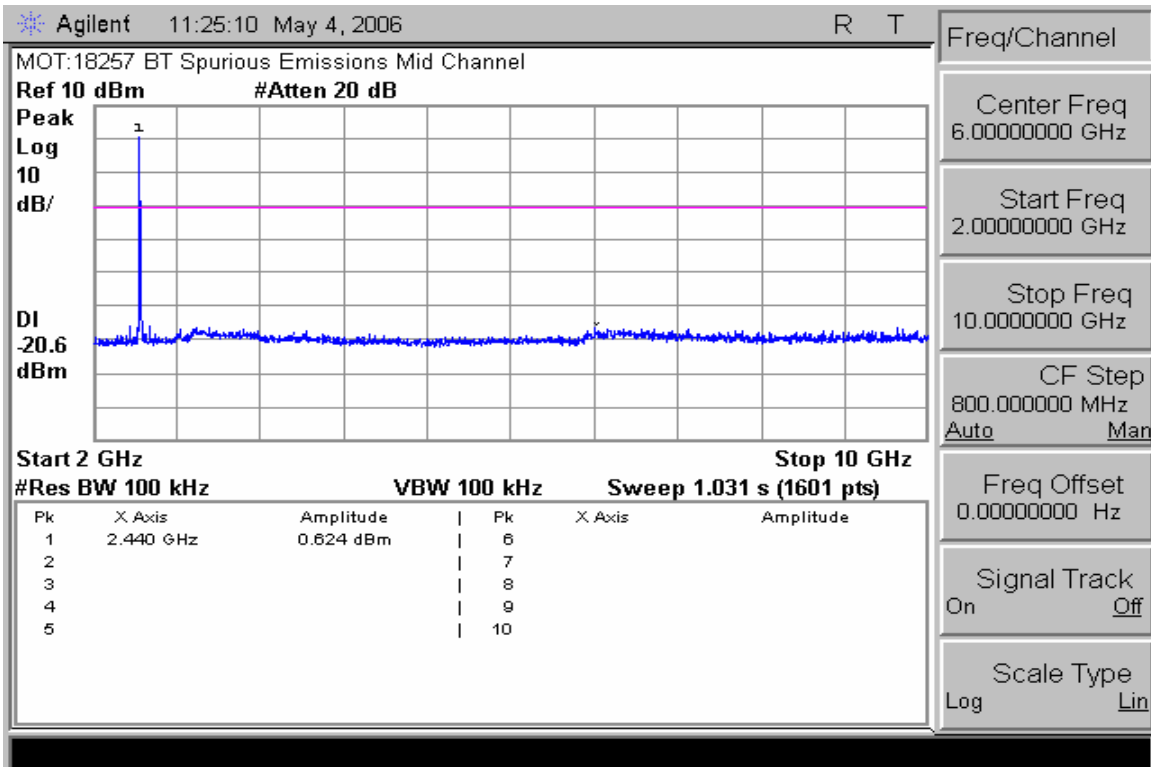
**Conducted Spurious Emissions 10-20GHz (Low Channel)**



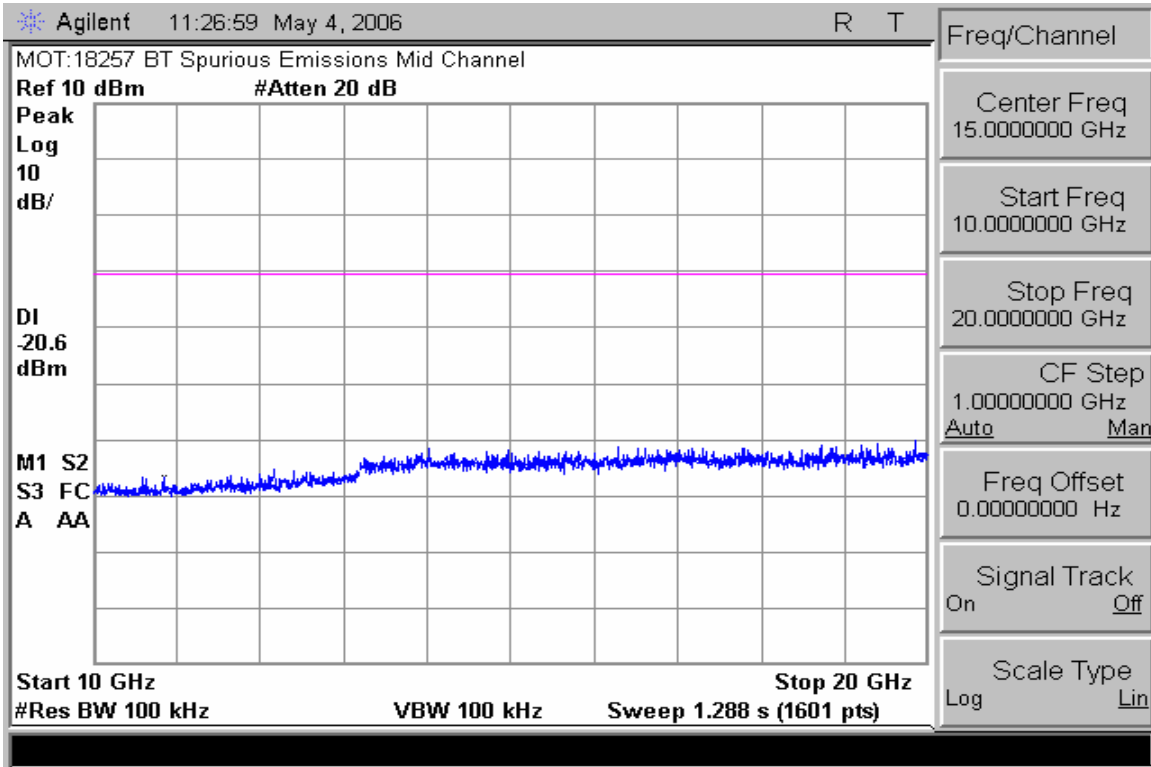
**Conducted Spurious Emissions 20-26.5GHz (Low Channel)**



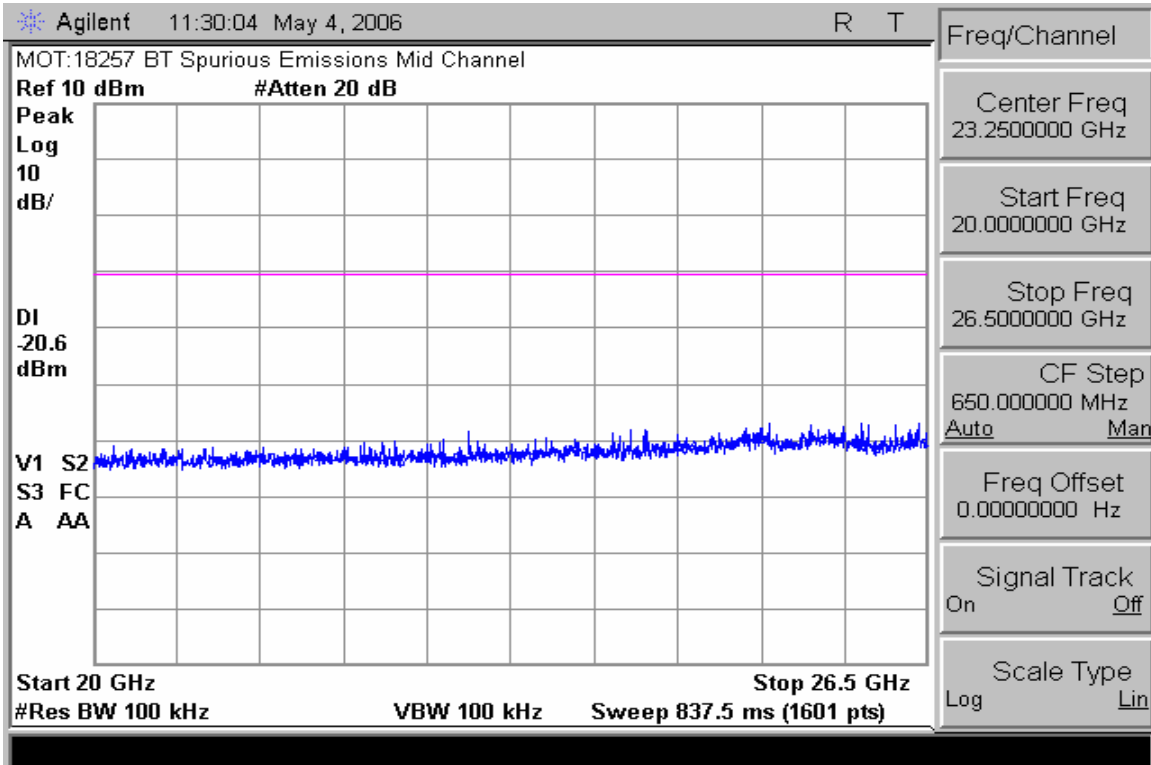
**Conducted Spurious Emissions 30-3000MHz (Mid Channel)**



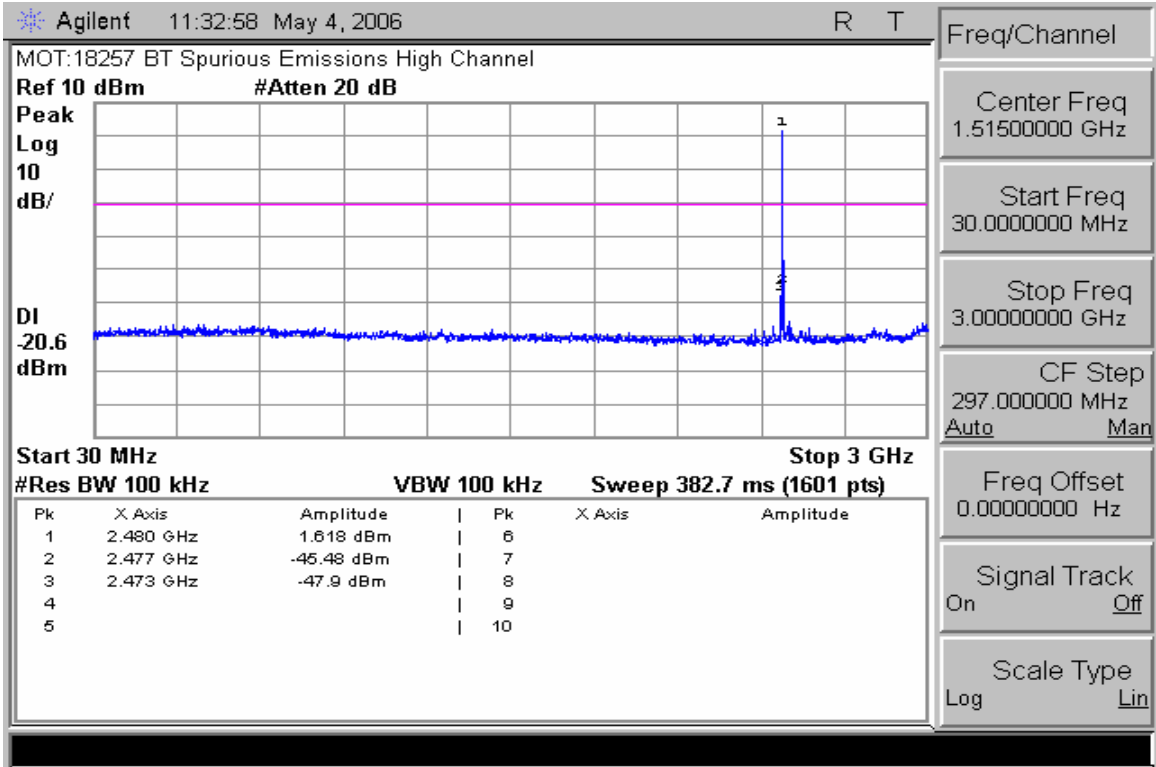
**Conducted Spurious Emissions 2-10GHz (Mid Channel)**



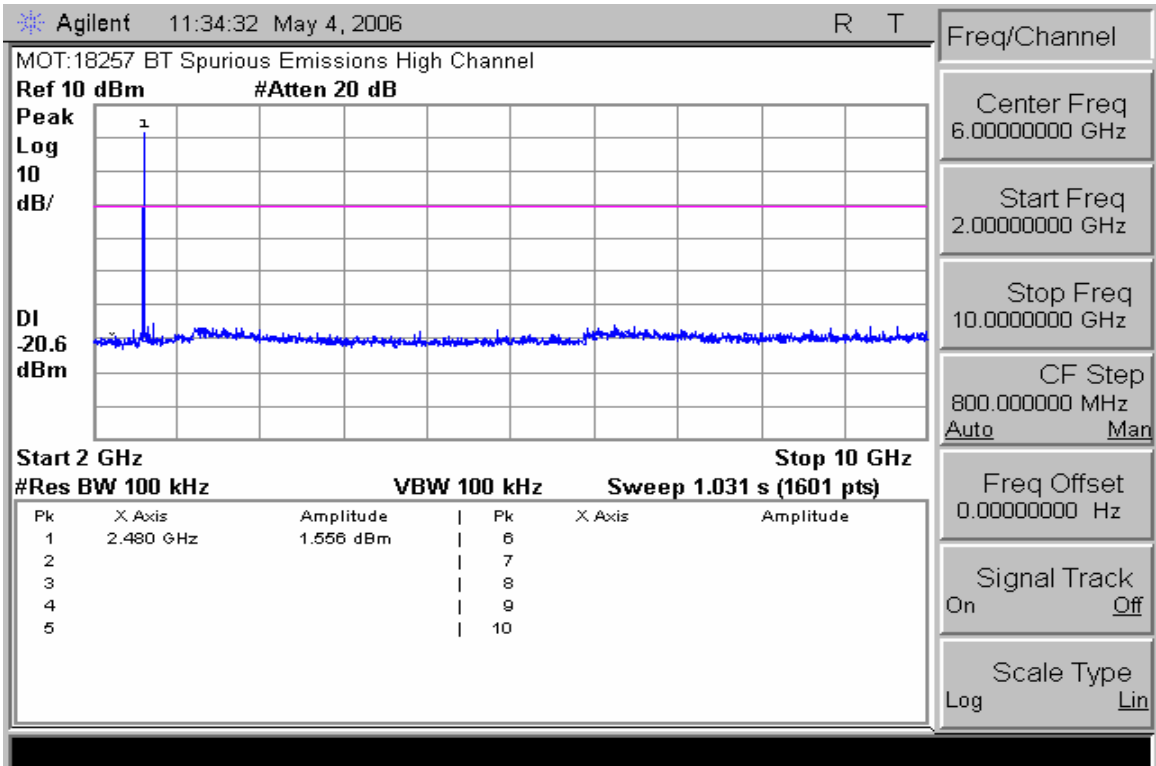
**Conducted Spurious Emissions 10-20GHz (Mid Channel)**



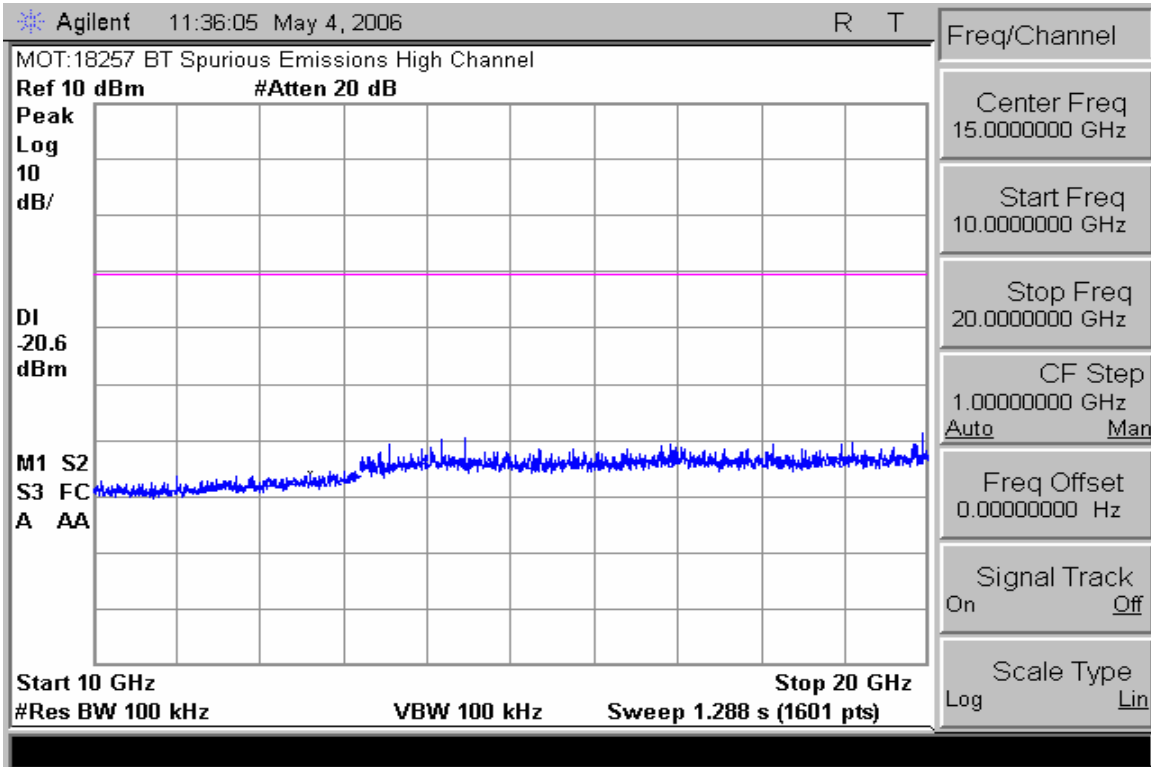
**Conducted Spurious Emissions 20-26.5GHz (Mid Channel)**



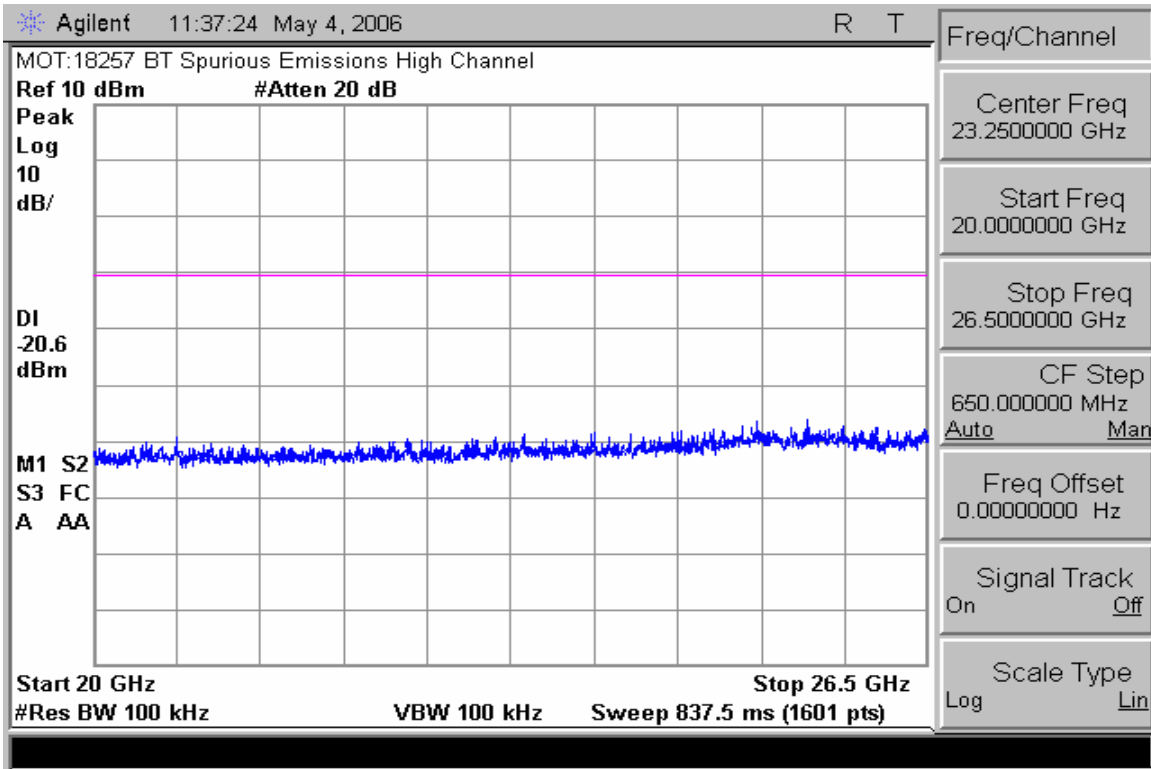
**Conducted Spurious Emissions 30-3000MHz (High Channel)**



**Conducted Spurious Emissions 2-10GHz (High Channel)**



**Conducted Spurious Emissions 10-20GHz (High Channel)**



**Conducted Spurious Emissions 20-26.5GHz (High Channel)**

**AC LINE CONDUCTED**

CFR 47 Part 15.207

**Measurement Procedure**

Measured levels of ac power line conducted emission shall be the radio-noise voltage from the line probe or across the 50  $\Omega$  LISN port, where permitted, terminated into a 50  $\Omega$  noise meter, or where permitted or required, the radio-noise current on the power line sensed by a current probe.

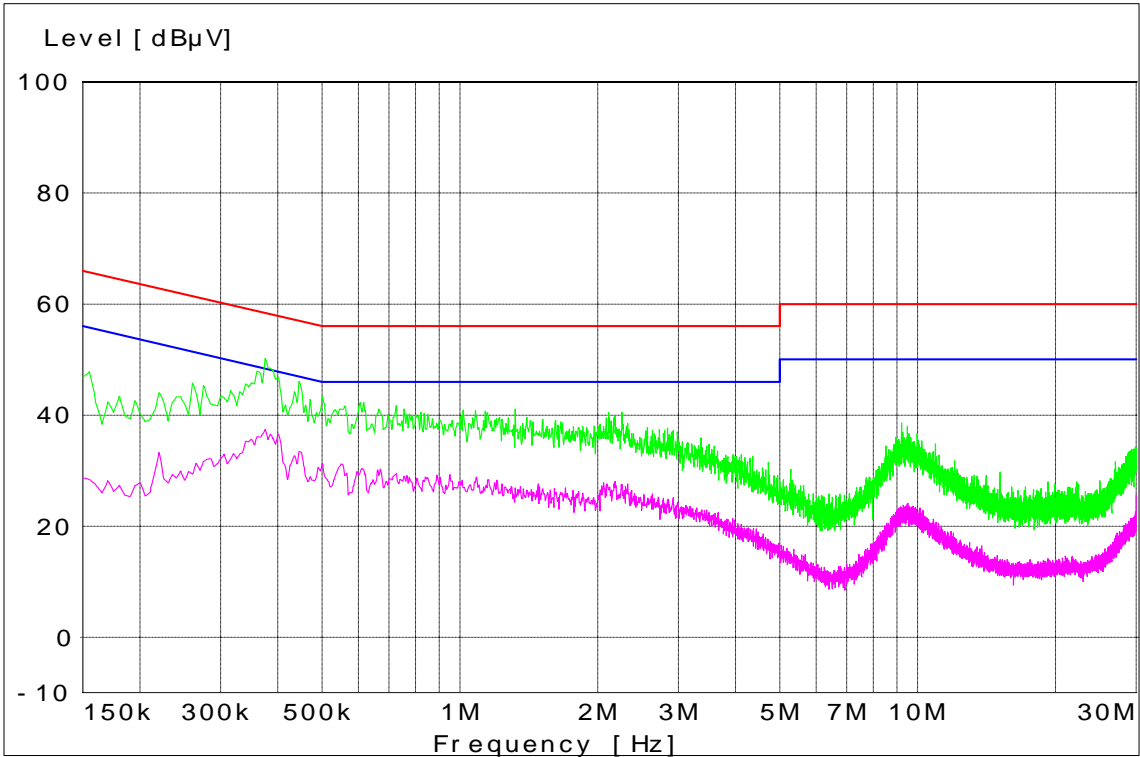
All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50  $\Omega$  measuring port is terminated by a 50  $\Omega$  radio-noise meter or a 50  $\Omega$  resistive load. All other ports are terminated in 50  $\Omega$ .

**Measurement Results**

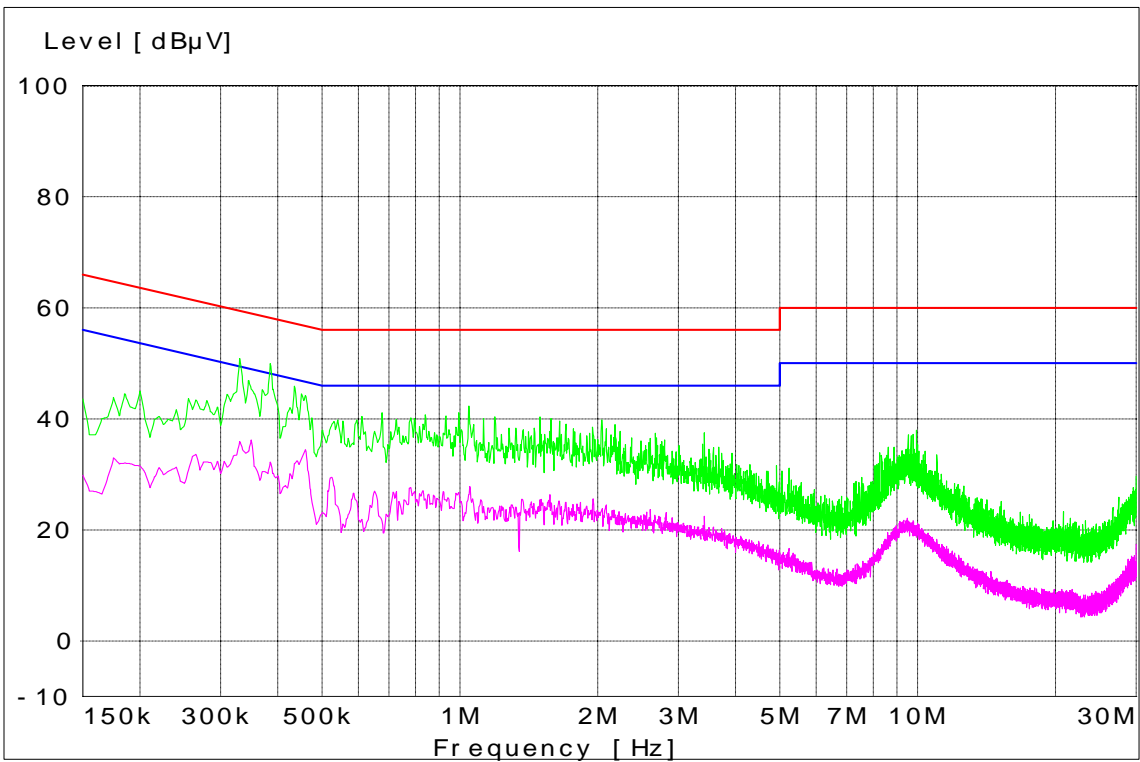
See attached:

Green – Peak Detector

Purple – Average Detector



**Bluetooth - Tx Mode – Line Coupling Hopping**



**Bluetooth - Tx Mode – Neutral Coupling Hopping**

**End of Test Report**