



**MOTOROLA**

**PERSONAL COMMUNICATIONS SECTOR**

**PRODUCT SAFETY AND COMPLIANCE  
EMC LABORATORY**

**EMC TEST REPORT - Addendum**

**Test Report Number** –14583/14670-1BT

**Report Date** – September 10, 2004

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.

A handwritten signature in blue ink that reads "Michael E. Hill".

Signature:

Name: Michael E. Hill

Title: Senior Electrical Engineer

Date: September 10, 2004

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: 1846-01



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**Test Report Details**

Tests Performed By: Motorola Personal Communications Sector  
Product Safety and Compliance Group  
600 North US Hwy 45  
Libertyville, IL 60048  
PH (847) 523-6167 Fax (847) 523-4538  
Motorola PCS FRN: 0004321311  
FCC Registration Number: 316588  
Industry Canada Number: IC3908

Radiated Emissions Performed By: Underwriters Laboratories  
International EMC Services  
333 Pfingsten RD  
Northbrook, IL 60062  
Contact: Lubomir Madjarov  
(Tel) 847/664-3957  
(Fax) 847/313-3957

Tests Requested By: Motorola Inc.  
Personal Communications Sector  
600 North US Hwy 45  
Libertyville, IL 60048

Product Type: Cellular Phone

Signaling Capability: GSM 850/1900, Bluetooth, WLAN

Model Number: MPx

Version: SGUG0156AA

Serial Numbers: 004400007088451, 004400007088022,  
004400007088485, 004400007088477,  
004400007088816, 004400007088840,  
004400007546334

Testing Complete Date: August 23, 2004

## **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:

- Part 15 Subpart C – Intentional Radiators
- Part 22 Subpart H - Public Mobile Services
- Part 24 - Personal Communications Services
- Part 90 - Private Land Mobile Radio Service

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4 2001, RSS-118 (AMPS), RSS-128 (TDMA), RSS-129 (CDMA), RSS-133 (PCS)

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	See plots
9	Conducted Spurious Emissions	Pass

Test	Test Name	Results
1	Carrier Frequency Separation	1.000MHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.893ms
4	20 dB Bandwidth	961 KHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	-0.099 dBm
8	Band Edges	See plots
9	Conducted Spurious Emissions	See plots

The margin with respect to the limit is the minimum margin for all modes and bands. ( ) indicates the margin at which the product exceeds the limit.

**General and Special Conditions**

The 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

Manufacturer	Equipment Type	Model No.	Serial Number	Cal. Due Date
Rohde & Schwarz	Receiver	ESI26	838786/010	5/17/2005
Hewlett-Packard	EMC Analyzer	8593EM	3536A00118	10/2/2004
Hewlett-Packard	EMC Analyzer	7405	US39440191	11/13/2004
Miteq	Preamplifier 0.1-26.5GHz	NSP2650-NF-S	966350	1/8/2005
ETS	DRG Horn Antenna	3115	6222	9/29/2004
A.H. Systems Inc.	DRG Horn Antenna	SAS-2--/571	365	12/17/2004
ETS	Log-Periodic Antenna	3148	1188	3/5/2005
ETS	Biconical Antenna	3110B	3370	11/14/2004
Attenuator	Weinschel	AS-6	6675	10/14/2004
Attenuator	Weinschel	AS-6	6677	11/4/2004
Rohde & Schwarz	Mobile Test Set	CMD 80	DE29008	N/A
Hewlett-Packard	Signal Generator	83623B	3844A01195	6/20/2005
Thermotron	Environmental Chamber	S-4	31580	1/5/2005
Hewlett-Packard	Pre-Amplifier	8347A	3307A02001	11/4/2004
Agilent	Power Meter	EE4418B	GB40206388	12/5/2004
Agilent	Power Sensor	E4412B	US38486321	11/23/2004
Hewlett-Packard	Pre-Amplifier	8447F	2805A03419	5/19/2005

### U.L. Equipment

Hewlett Packard	QP Adapter	85650A	2811A01069	1/8/2005
Hewlett Packard	S/A Display	8566B	2542A12974	1/8/2005
Hewlett Packard	S/A	8566B	2637A03376	1/8/2005
Hewlett Packard	RF Preselector	85685A	2810A00692	1/8/2005
Rohde & Schwarz	S/A	FSEK20	DE2525315	1/9/2005
EMCO	Horn Antenna 1-18GHz	3115	2638	7/10/2005
EMCO	Horn Antenna 18-26.5GHz	3160-09	9904-1165	N/A*
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	6/23/2005
Chase	Log-Periodic Antenna	UPA6108	1120	6/23/2005

All equipment is on a one-year calibration cycle.

## **Description of Bluetooth Transmitter**

The MPX cell phone offers Bluetooth as a feature. The Bluetooth spread-spectrum, frequency hopping transceiver is designed to operate between 2400 and 2483 MHz. The Bluetooth antenna has a peak gain of 2.7 dBi and 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. Therefore conducted AC line emissions testing as described in CFR47, Part 15.207 was not necessary.

## **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 MPX had its hopping function enabled. The following spectrum analyzer settings were used:

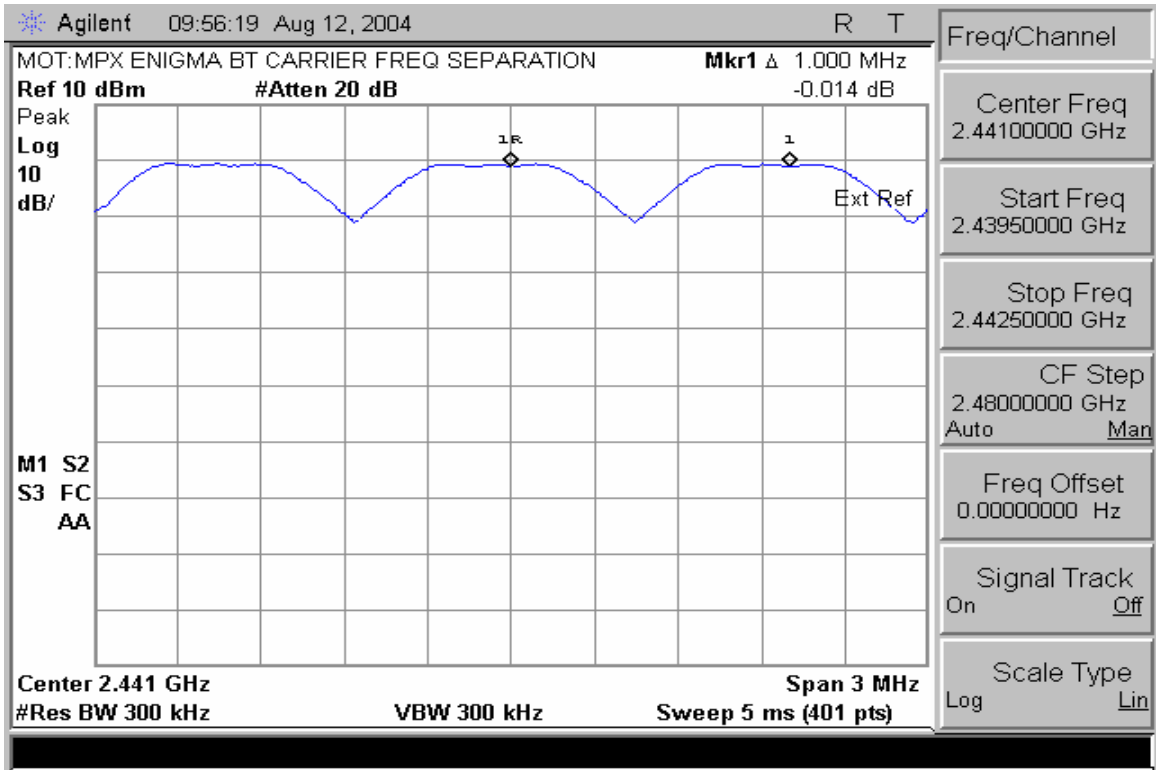
1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span
3. Video (or Average) Bandwidth (VBW)  $\geq$  RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

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.

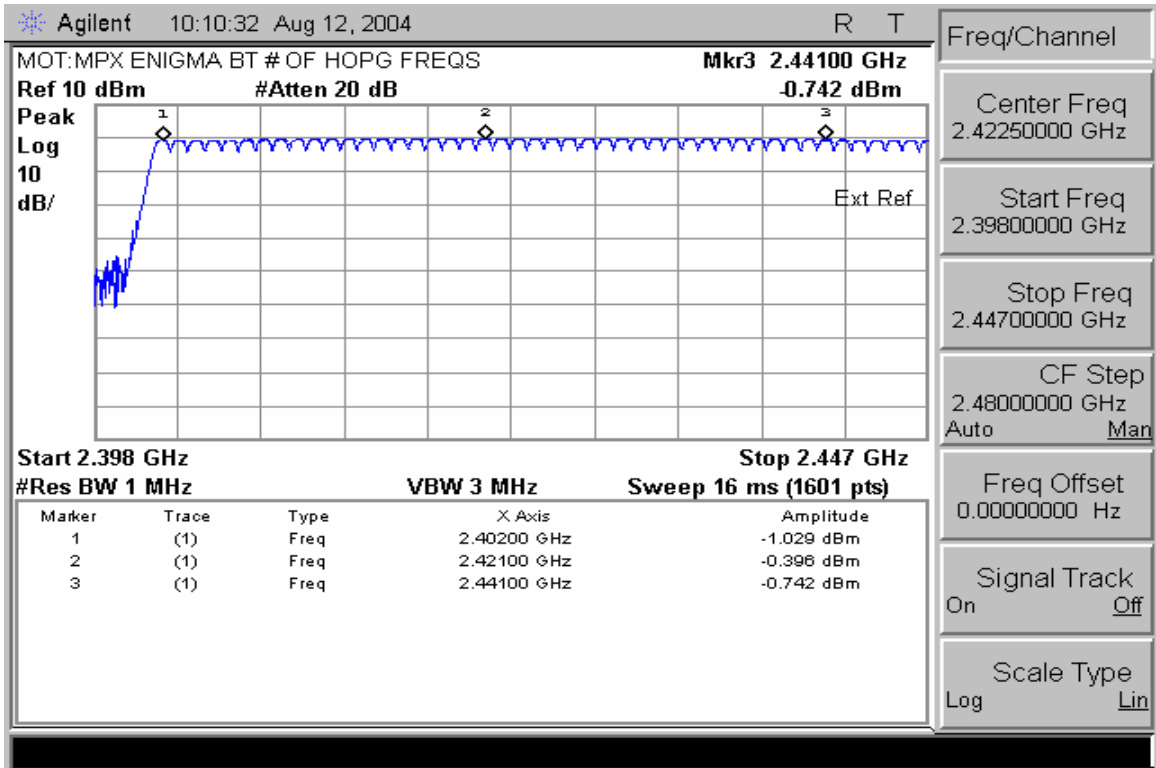
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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

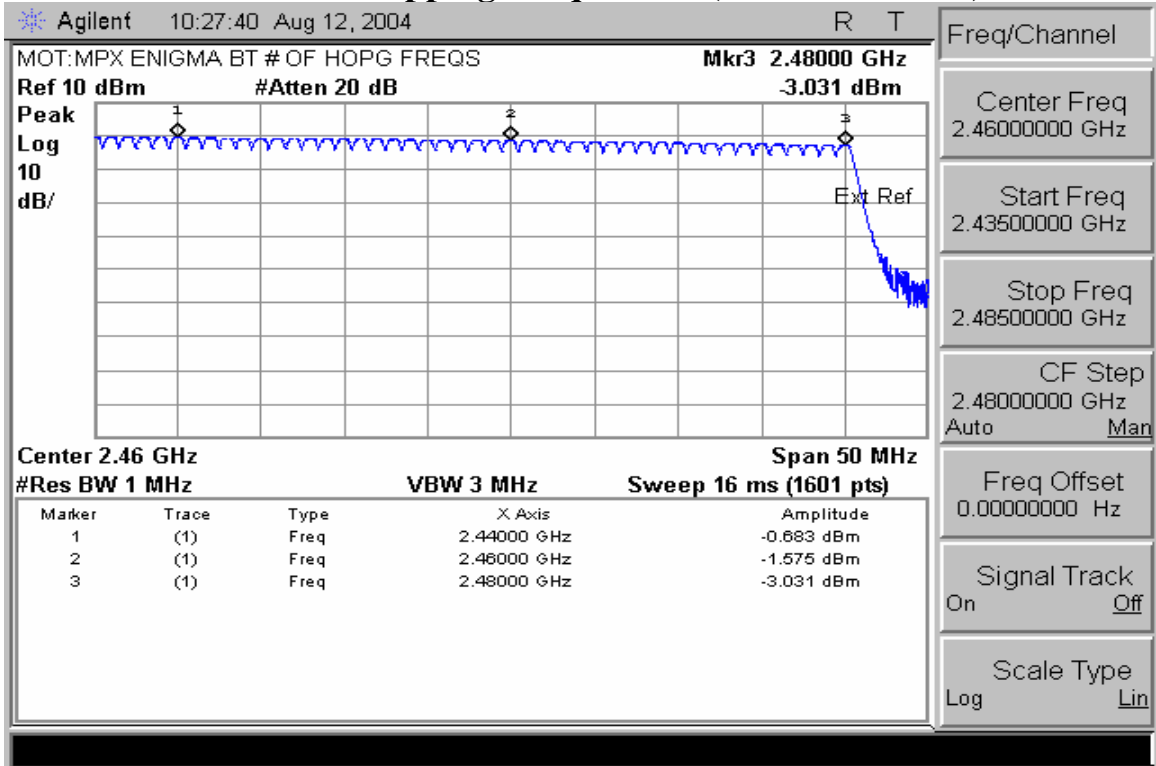
The trace was allowed to stabilize.

### **Measurement Results**

See attached.



**Number of Hopping Frequencies (Channels 2 – 42)**



**Number of Hopping Frequencies (Channels 42 – 80)**

## **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.

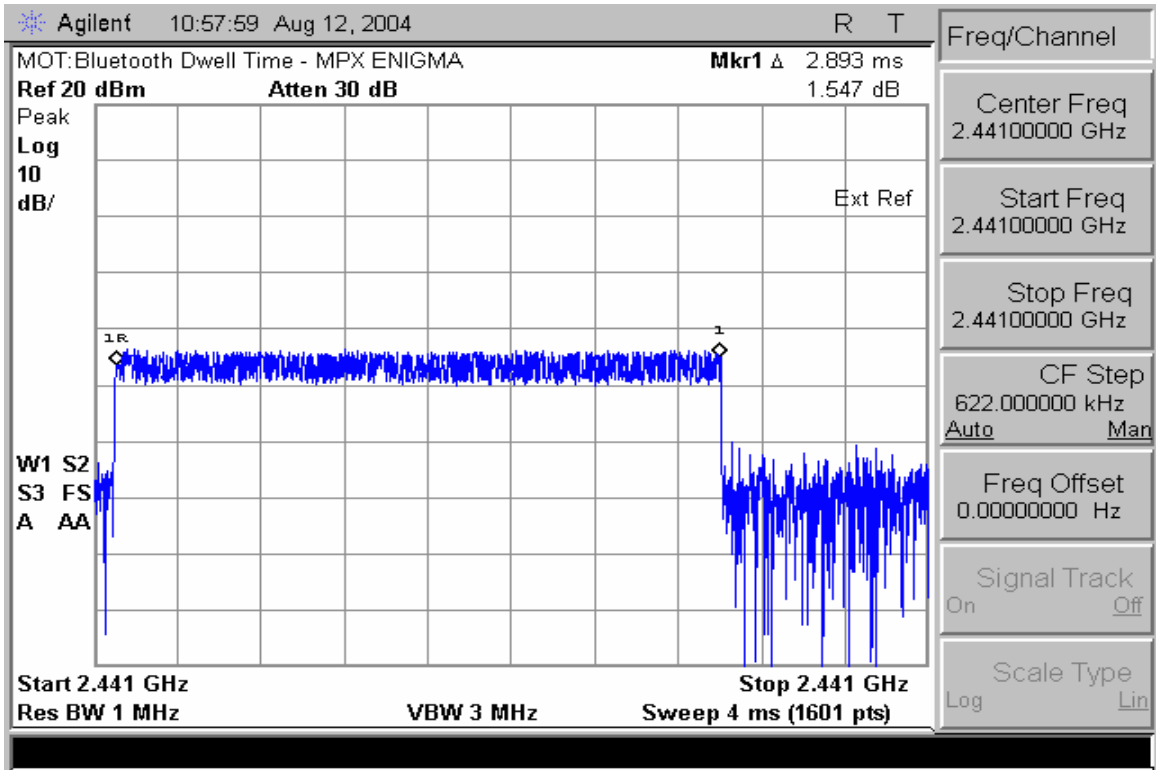
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

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**

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.

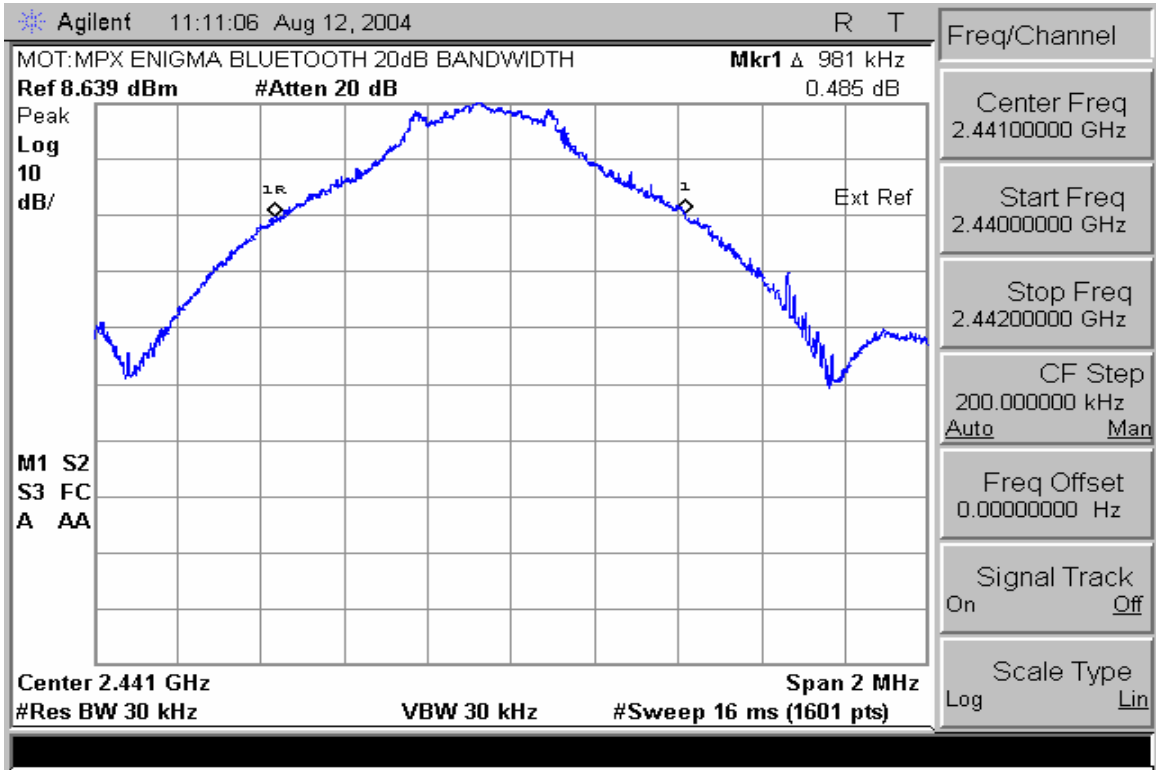
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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**

Attached



**20 dB Bandwidth**

## FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 15.249

### **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.

The Equipment-Under-Test is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole.

The field strength of each radiated emission is calculated by correcting the EMI receiver level for cable loss, amplifier gain, and antenna correction factors.

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

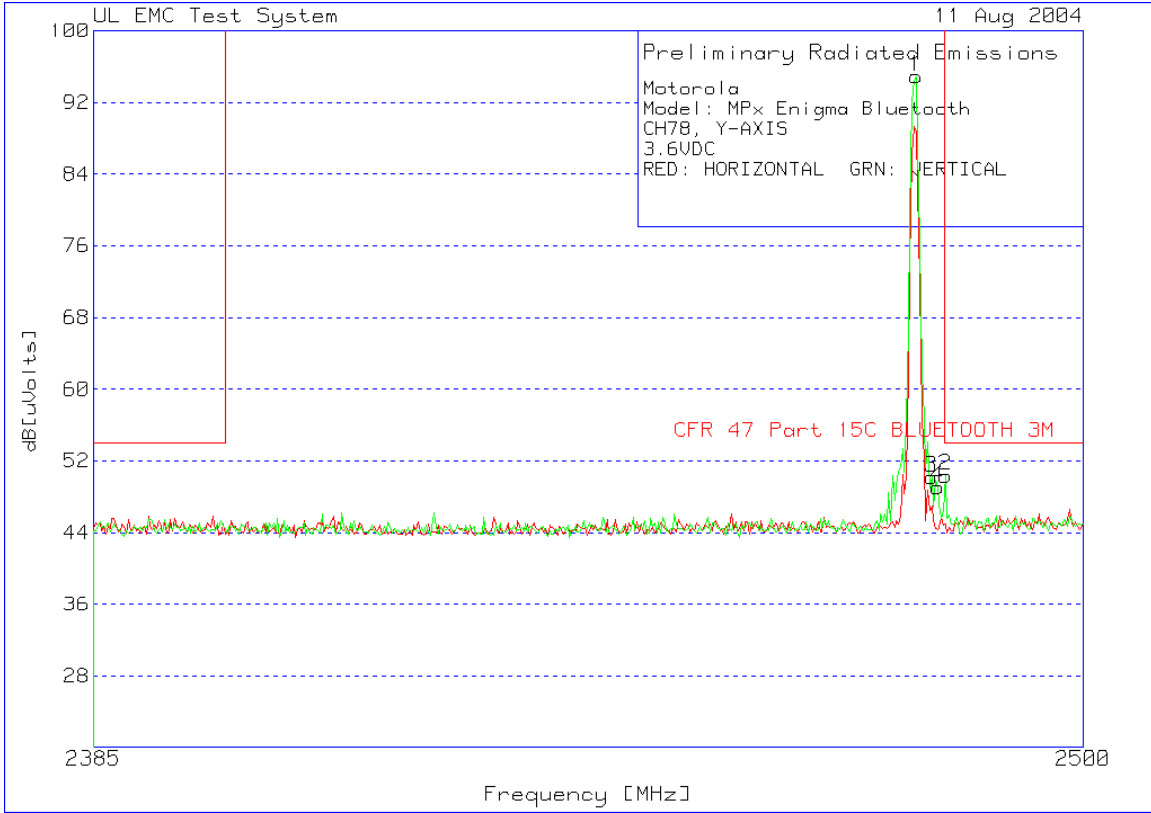
A fully charged battery was used for the supply voltage.

This data was taken at Underwriter's Laboratories.

### **Measurement Results**

Attached



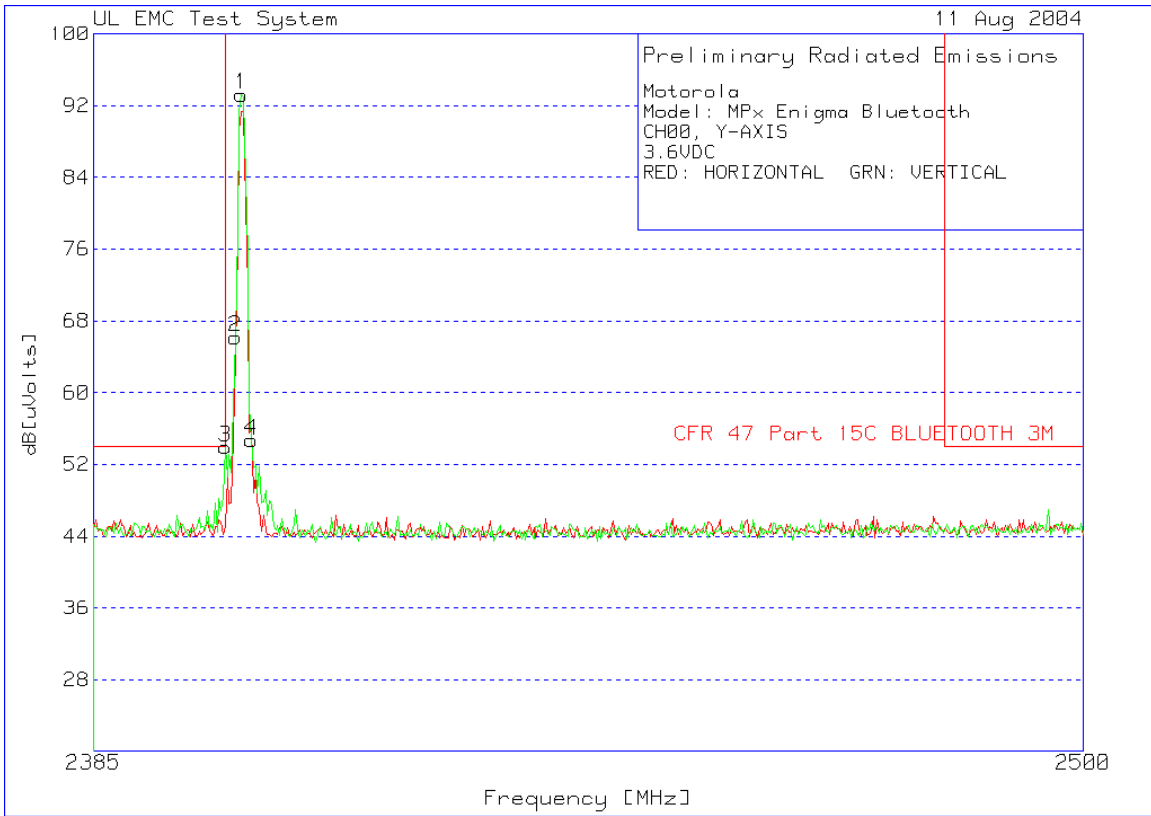


**Inband High Channel**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH78, Y-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
2 - 4GHz 2385 - 2500MHz										
1	2480.18	69.62 pk		3.3	22	94.92	999	-904.08	100	Vert
2	2483.637	24.95 pk		3.3	22.1	50.35	54	-3.65	100	Vert
3	2482.024	24.9 pk		3.3	22	50.2	999	-948.8	100	Vert
4	2482.715	23.75 pk		3.3	22	49.05	999	-949.95	100	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE

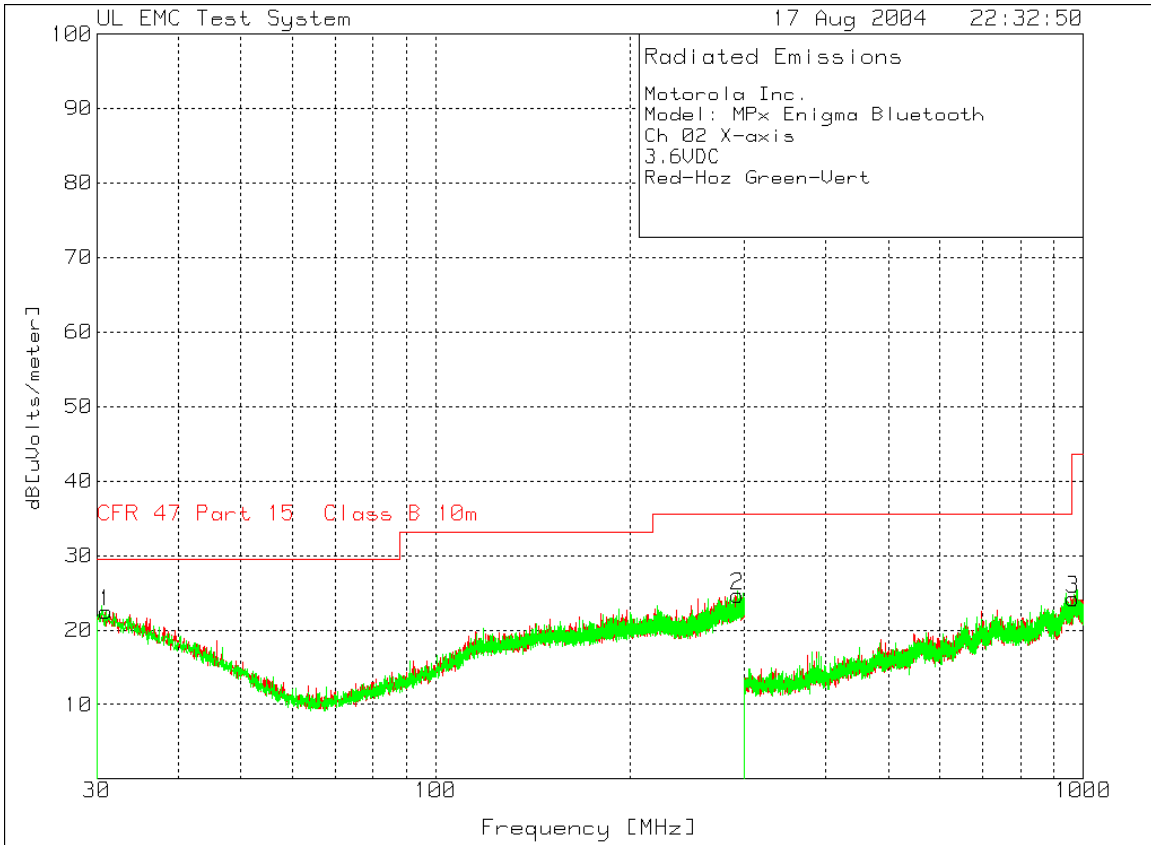


**Inband Low Channel**

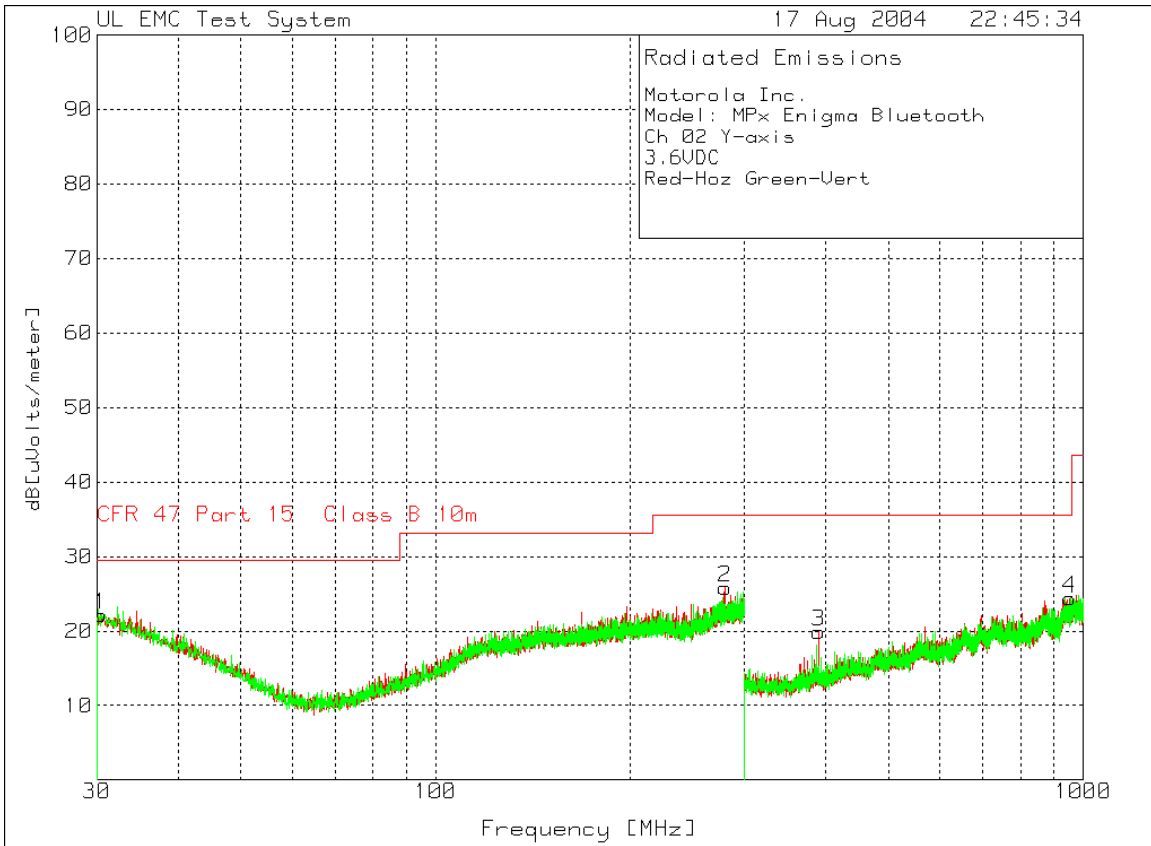
Motorola  
 Model: MPx Enigma Bluetooth  
 CH00, Y-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2385 - 2500MHz</b>										
1	2401.824	68.12 pk		3.3	21.8	93.22	999	-905.78	99	Vert
2	2401.132	41.08 pk		3.3	21.8	66.18	999	-932.82	99	Vert
3	2399.98	28.84 pk		3.3	21.8	53.94	54	-0.06	99	Vert
4	2402.976	29.6 pk		3.3	21.8	54.7	999	-944.3	99	Vert

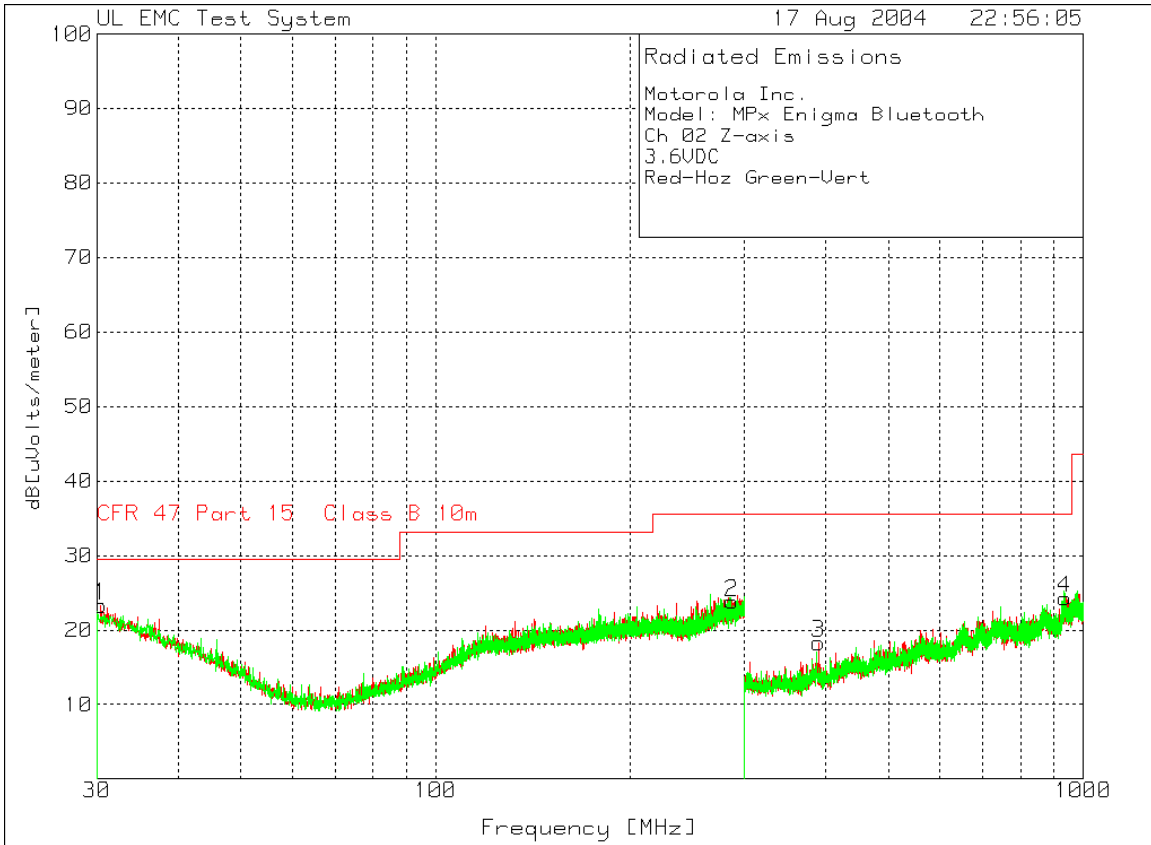
LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



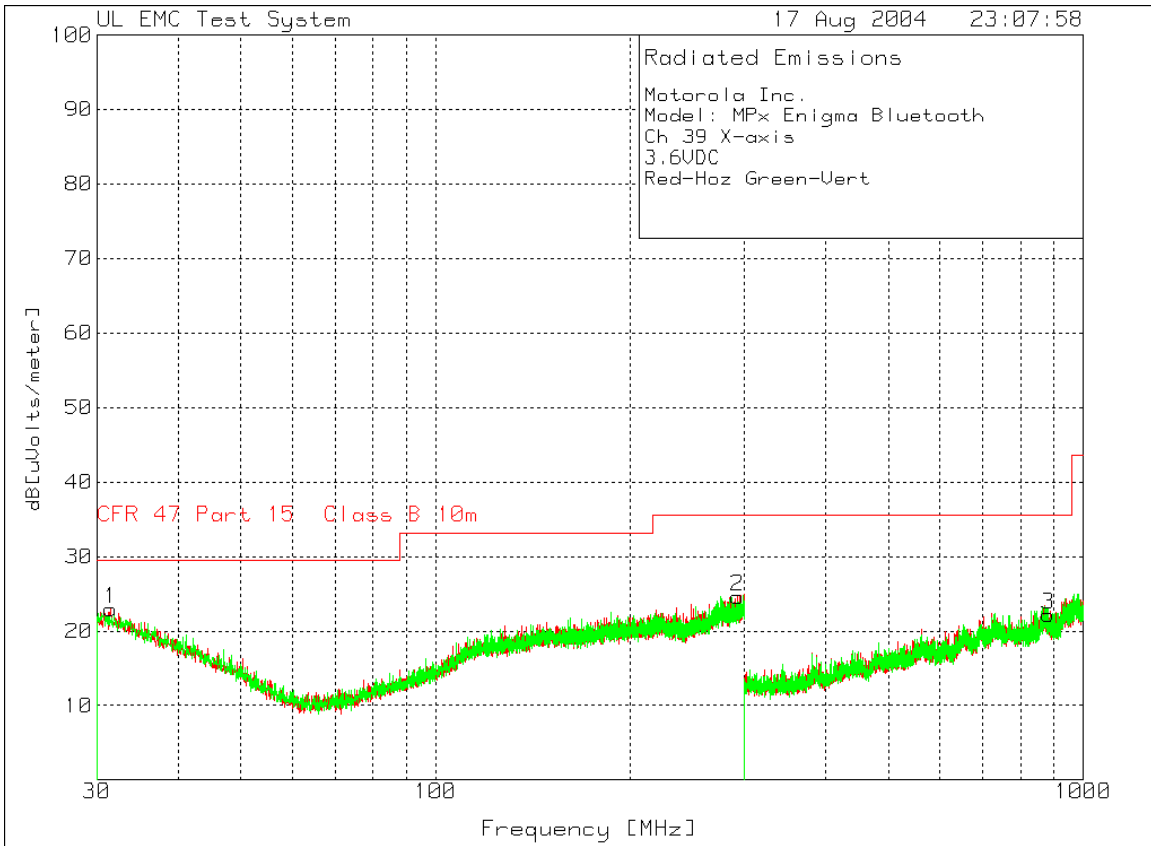
**30 -1000MHz Low Channel Dual Polarization X-Axis**



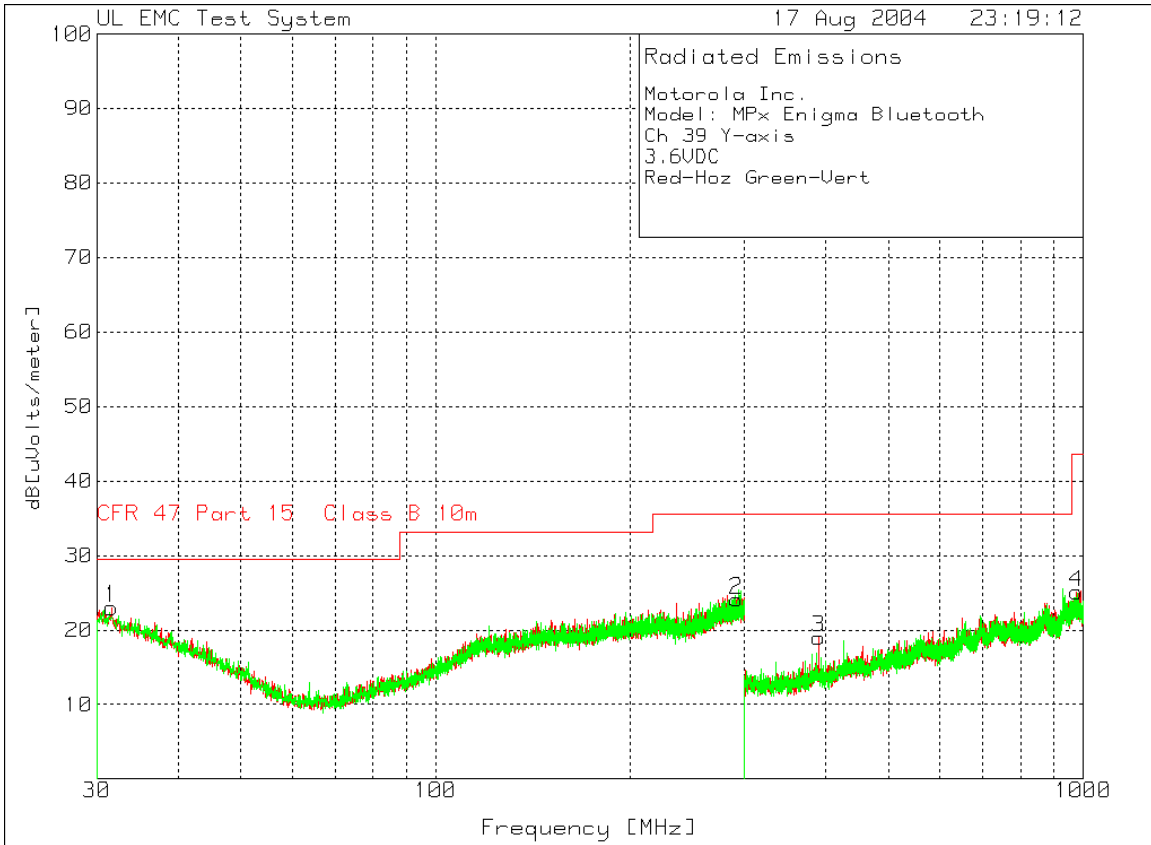
**30 -1000MHz Low Channel Dual Polarization Y-Axis**



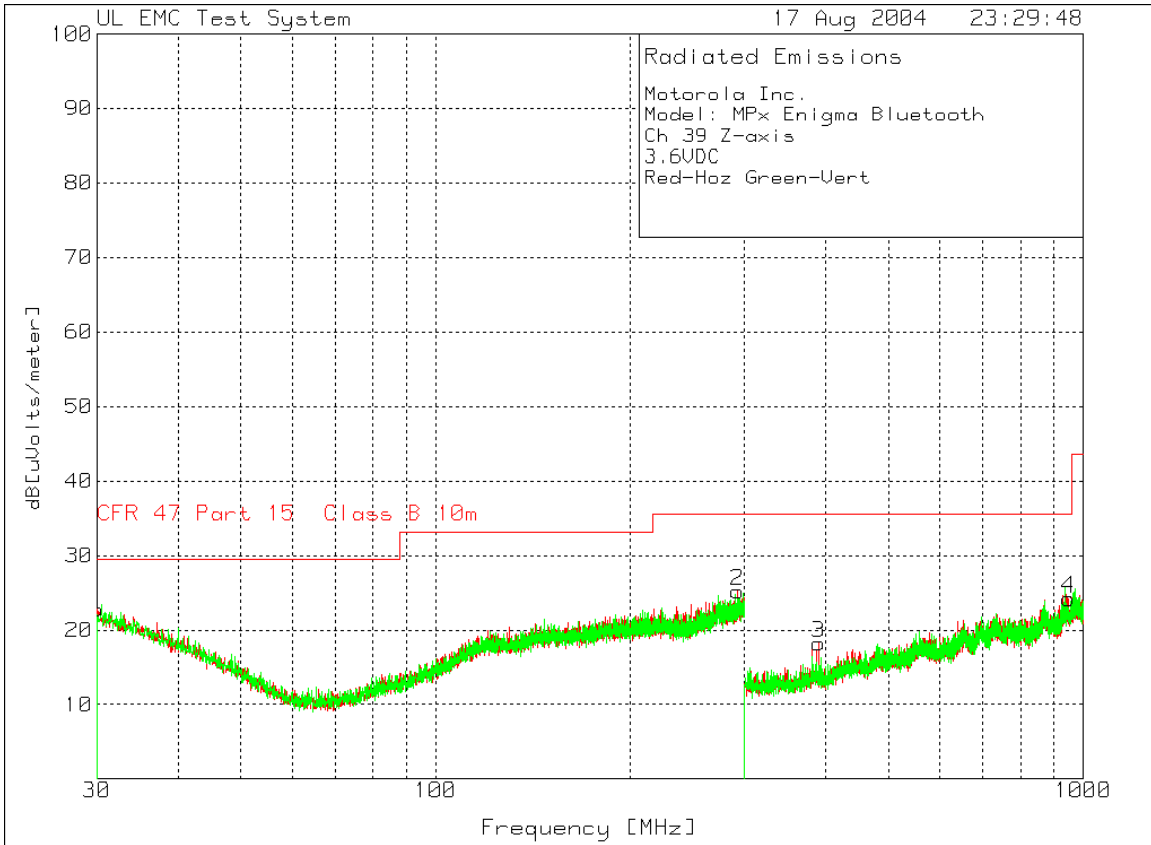
**30 -1000MHz Low Channel Dual Polarization Z-Axis**



**30-1000MHz Mid Channel Dual Polarization X-Axis**

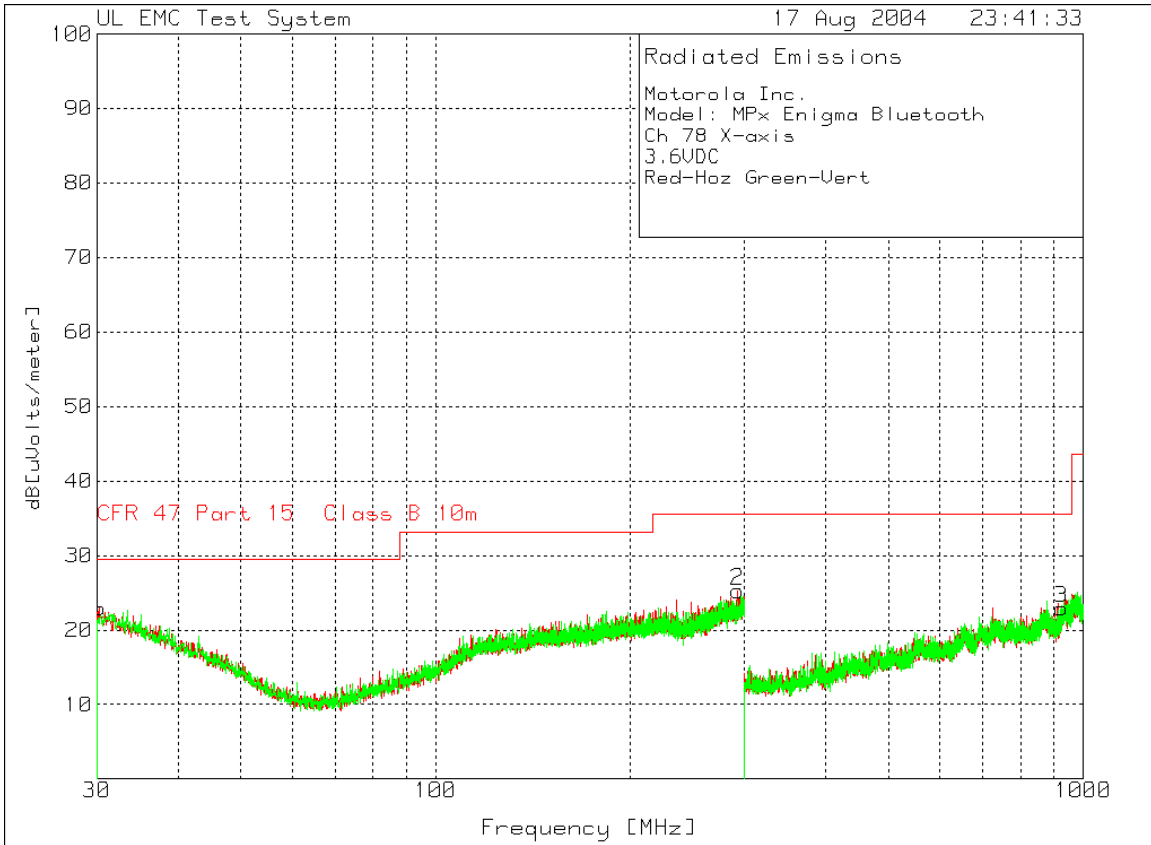


**30-1000MHz Mid Channel Dual Polarization Y-Axis**

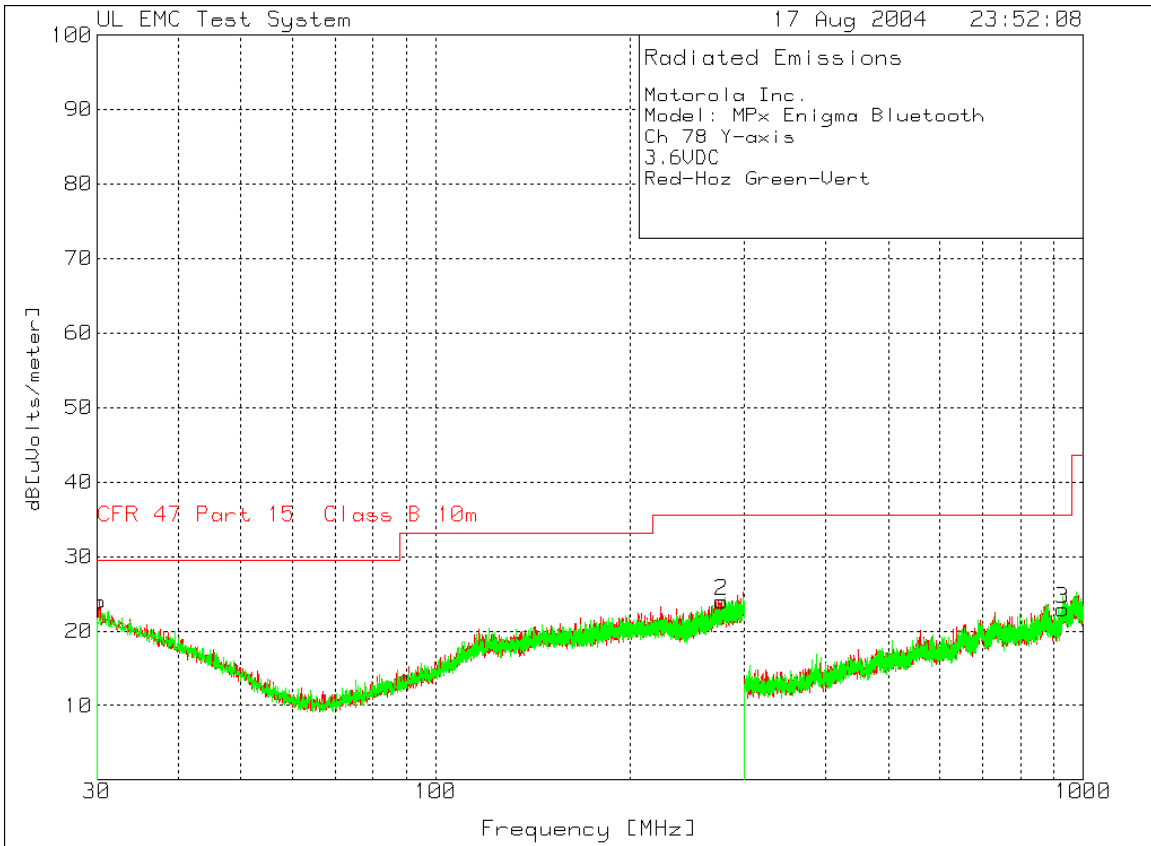


**30-1000MHz Mid Channel Dual Polarization Z-Axis**

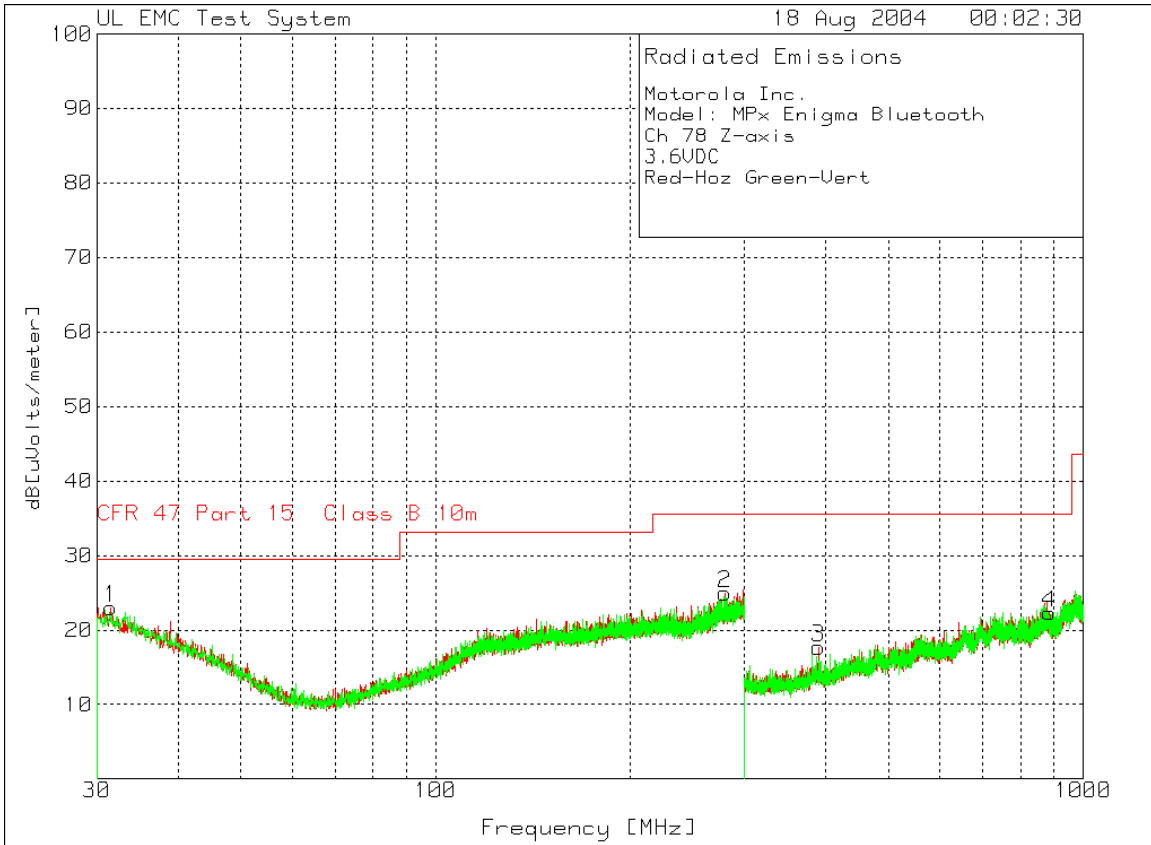




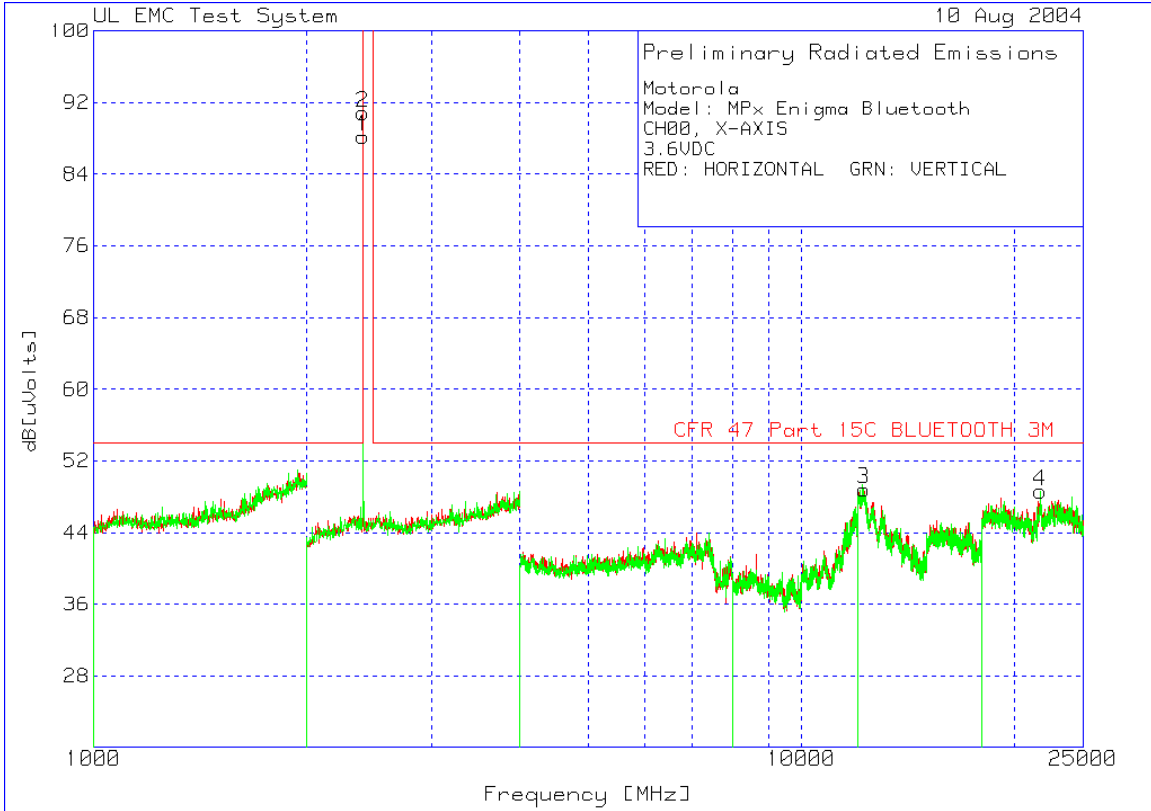
**30-1000MHz High Channel Dual Polarization X-Axis**



**30-1000MHz High Channel Dual Polarization Y-Axis**



**30-1000MHz High Channel Dual Polarization Z-Axis**

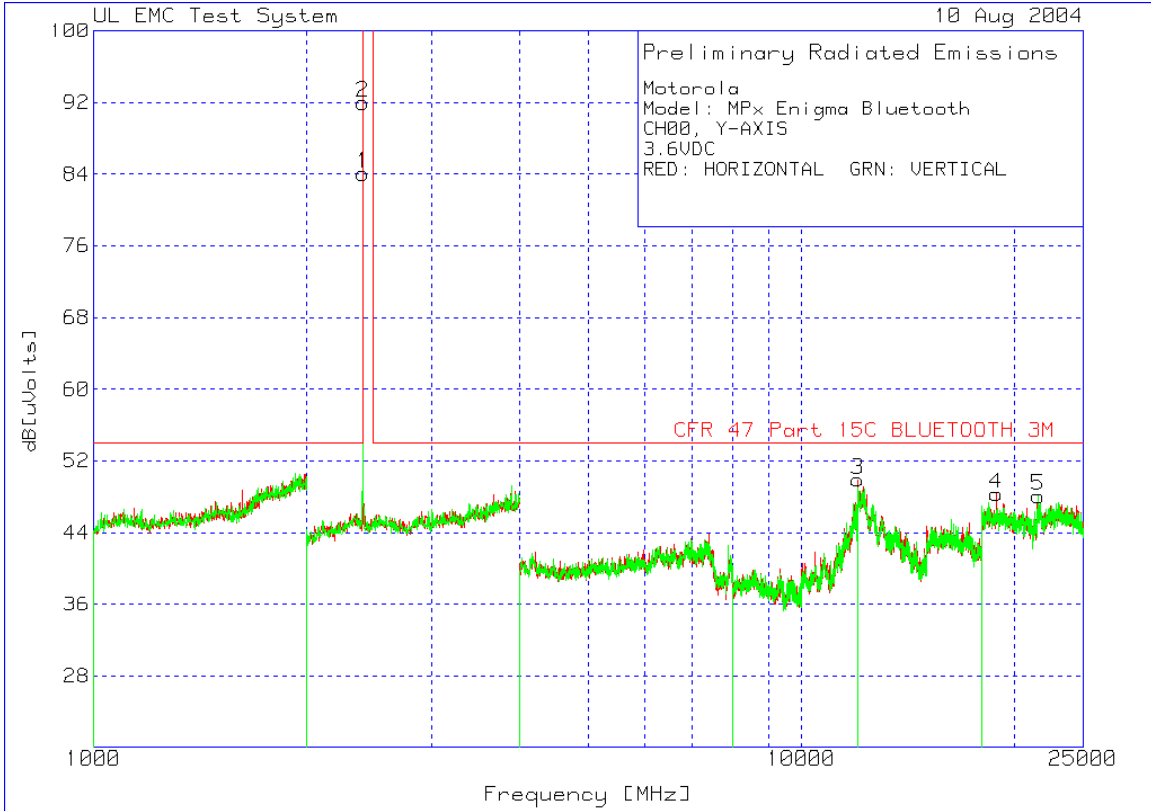


**1-25GHz Low Channel X-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH00, X-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2400.802	63.08 pk			3.3	21.8	88.18	999	-910.82	150 Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2400.802	65.77 pk			3.3	21.8	90.87	999	-908.13	150 Vert
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12240.24	50.25 pk			-40.8	39.4	48.85	54	-5.15	150 Vert
<b>18-26.5GHz 18000 - 25000MHz</b>										
4	21734.735	69.13 pk			-60.9	40.4	48.63	54	-5.37	100 Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



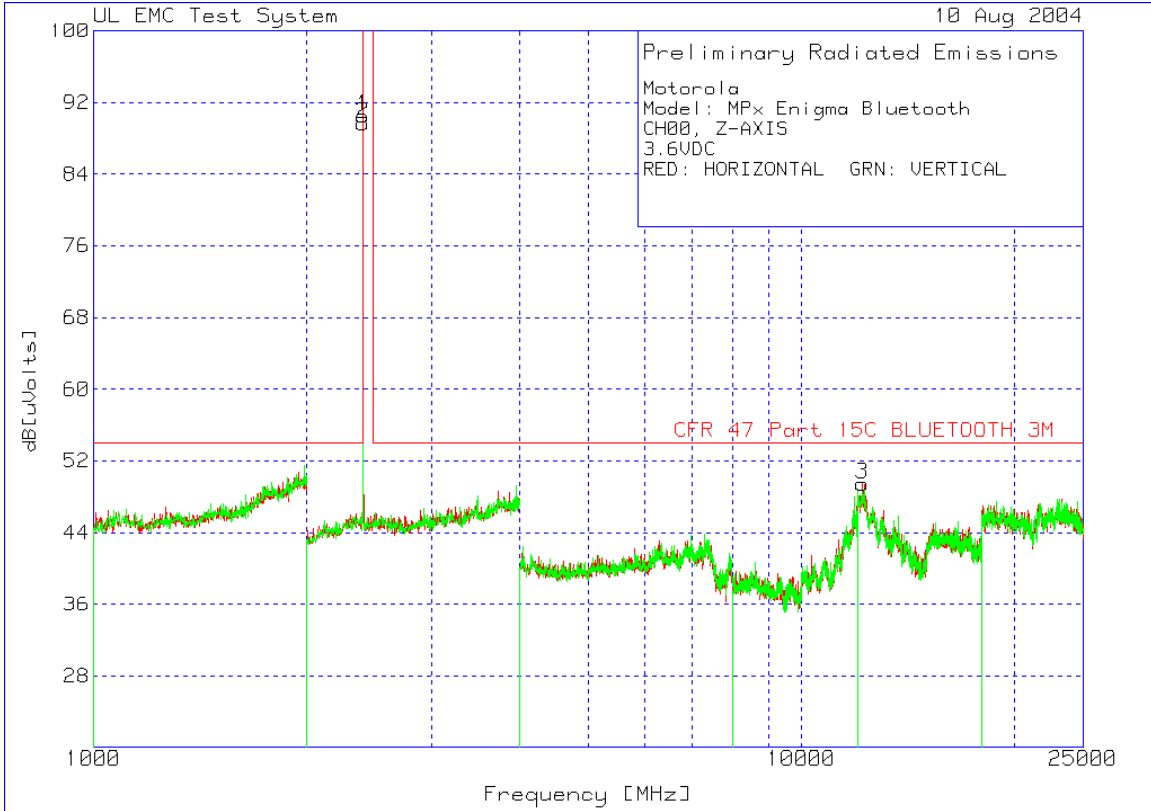
**1-25GHz Low Channel Y-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH00, Y-AXIS  
 3.6VDC

RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2400.802	58.98 pk		3.3	21.8	84.08	999	-914.92	150	Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12006.006	51.79 pk		-41.3	39.4	49.89	54	-4.11	100	Horz
<b>18-26.5GHz 18000 - 25000MHz</b>										
4	18833.834	75.62 pk		-67.4	40.1	48.32	54	-5.68	100	Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2400.802	66.9 pk		3.3	21.8	92	999	-907	100	Vert
<b>18-26.5GHz 18000 - 25000MHz</b>										
5	21601.602	68.88 pk		-61.1	40.3	48.08	54	-5.92	99	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE

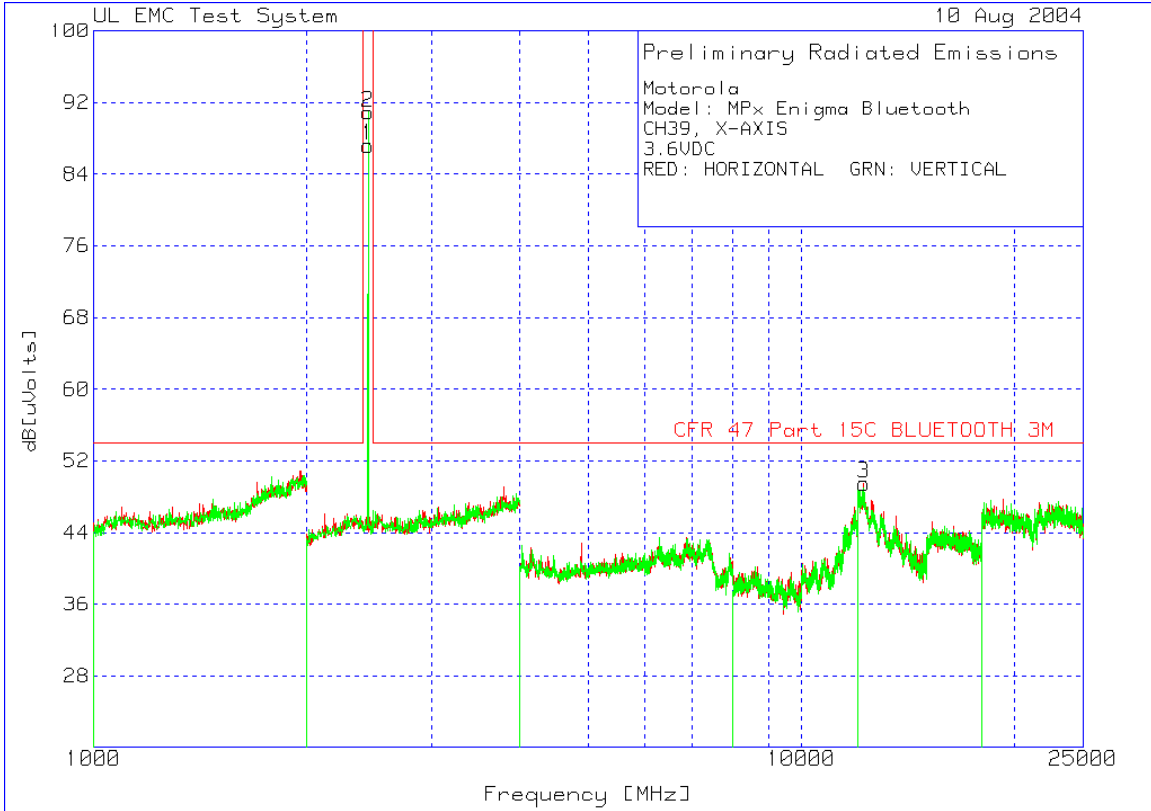


**1-25GHz Low Channel Z-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH00, Z-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2400.802	65.4 pk		3.3	21.8	90.5	999	-908.5	100	Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12180.18	51.64 pk		-41.6	39.4	49.44	54	-4.56	150	Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2400.802	64.57 pk		3.3	21.8	89.67	999	-909.33	100	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE

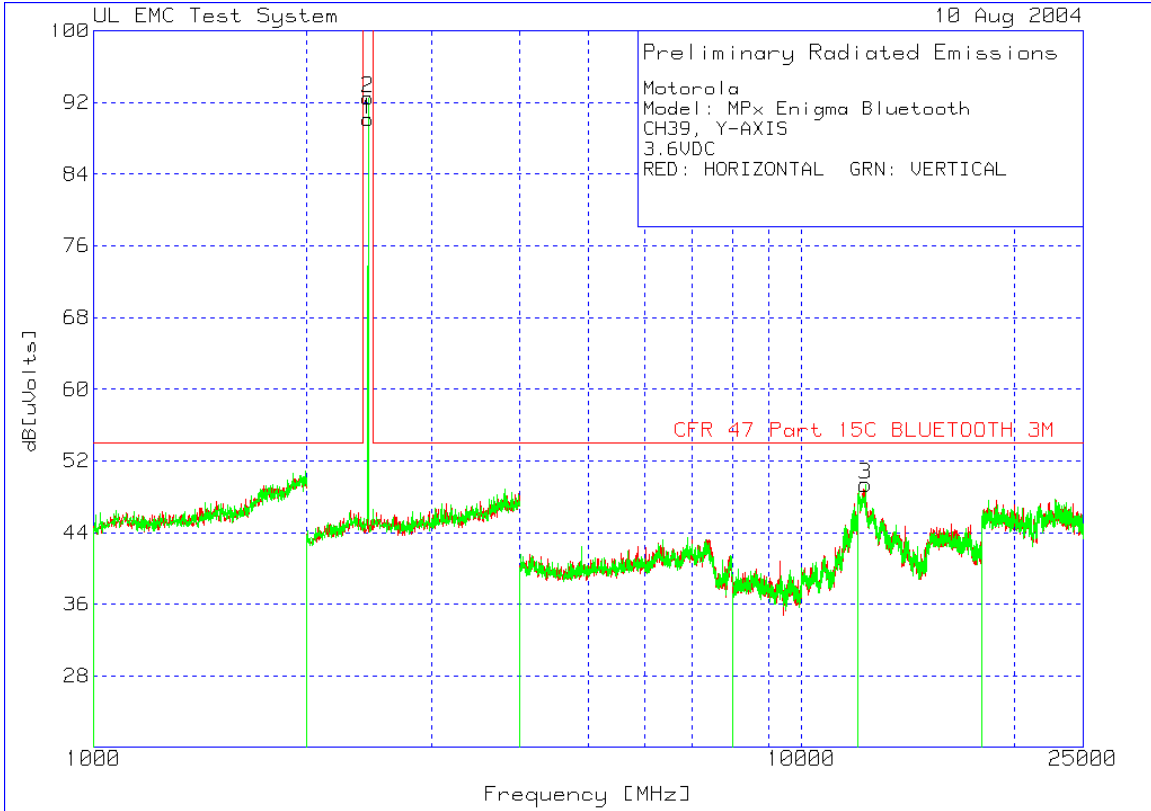


**1-25 GHz Mid-Channel X-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH39, X-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2440.882	62.01	pk		3.3	21.9	87.21	999	-911.79	149 Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12240.24	50.89	pk	-40.8	39.4	49.49	54	-4.51	100 Horz	
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2440.882	65.71	pk		3.3	21.9	90.91	999	-908.09	149 Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



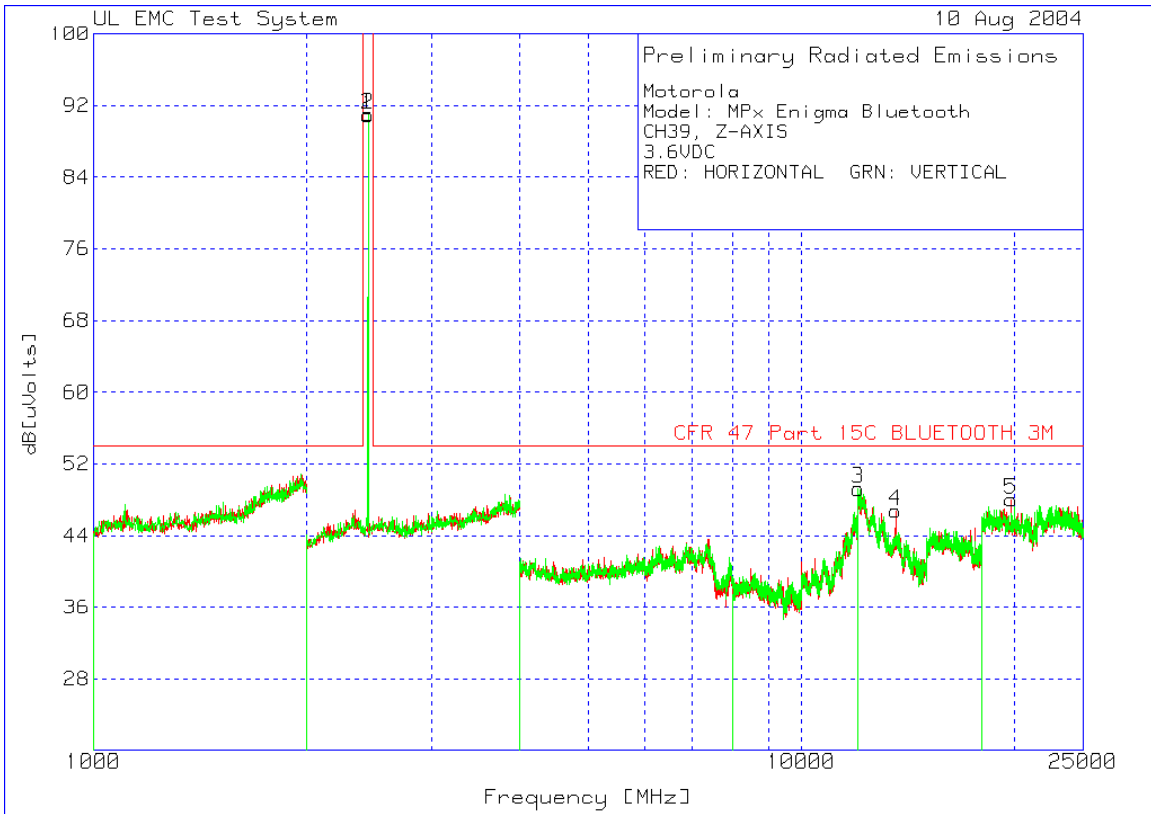
**1-25GHz Mid-Channel Y-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH39, Y-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2440.882	64.95 pk		3.3	21.9	90.15	999	-908.85	100	Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2440.882	67.32 pk		3.3	21.9	92.52	999	-906.48	100	Vert
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12306.306	51.47 pk		-41.5	39.4	49.37	54	-4.63	99	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



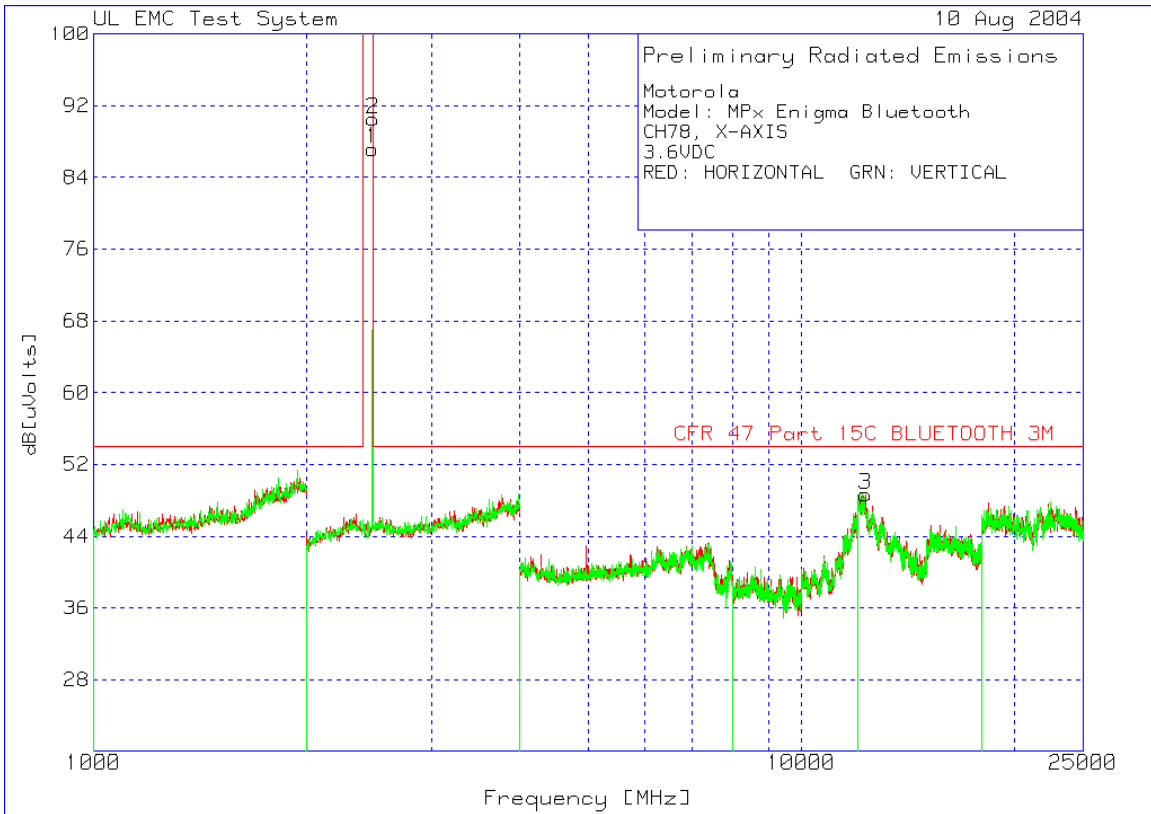


**1-25 GHz Mid-Channel Z-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH39, Z-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2440.882	65.74 pk		3.3	21.9	90.94	999	-908.06	100	Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
4	13579.58	51.07 pk		-44.1	39.8	46.77	54	-7.23	150	Horz
<b>18-26.5GHz 18000 - 25000MHz</b>										
5	19772.773	76.32 pk		-68.6	40.3	48.02	54	-5.98	150	Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2440.882	65.82 pk		3.3	21.9	91.02	999	-907.98	100	Vert
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12018.018	51.34 pk		-41.5	39.4	49.24	54	-4.76	100	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE

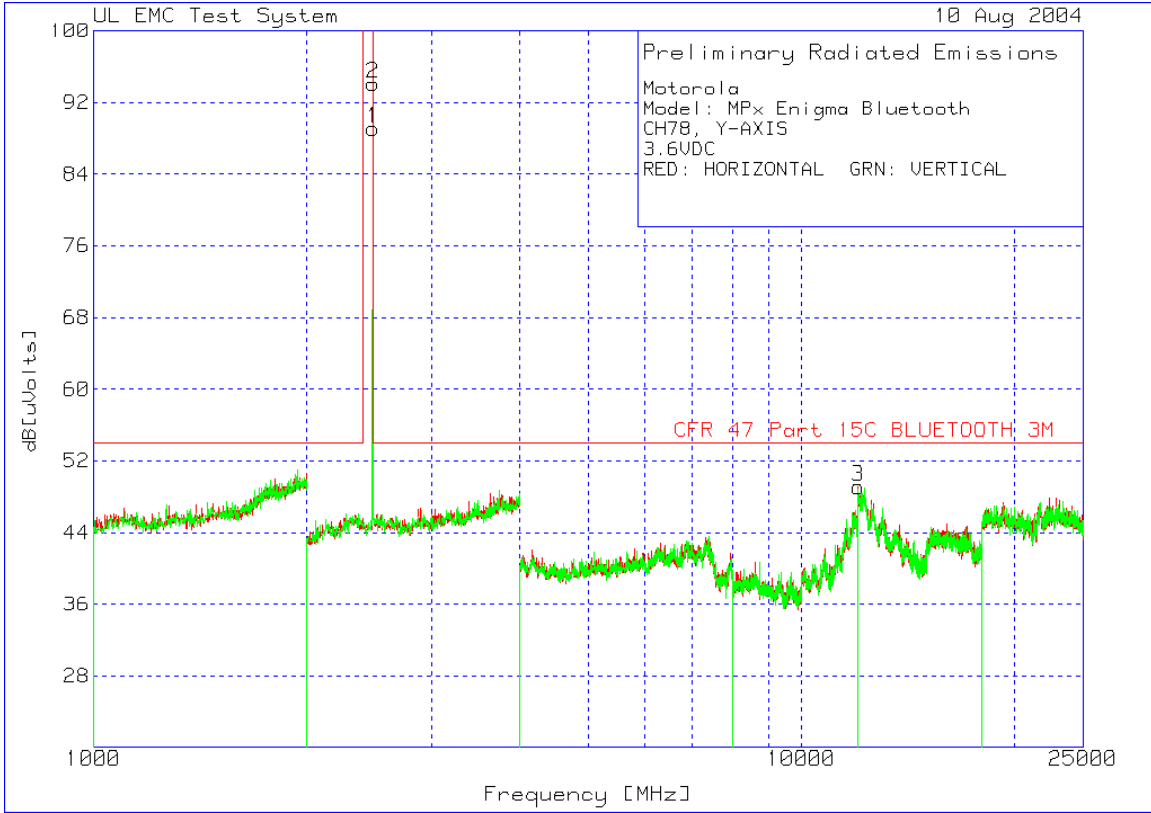


**1-25 GHz High-Channel X-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH78, X-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2476.954	61.9 pk		3.3	22	87.2	999	-911.8		99 Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12306.306	50.74 pk		-41.5	39.4	48.64	54	-5.36		100 Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2480.962	65.22 pk		3.3	22	90.52	999	-908.48		149 Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



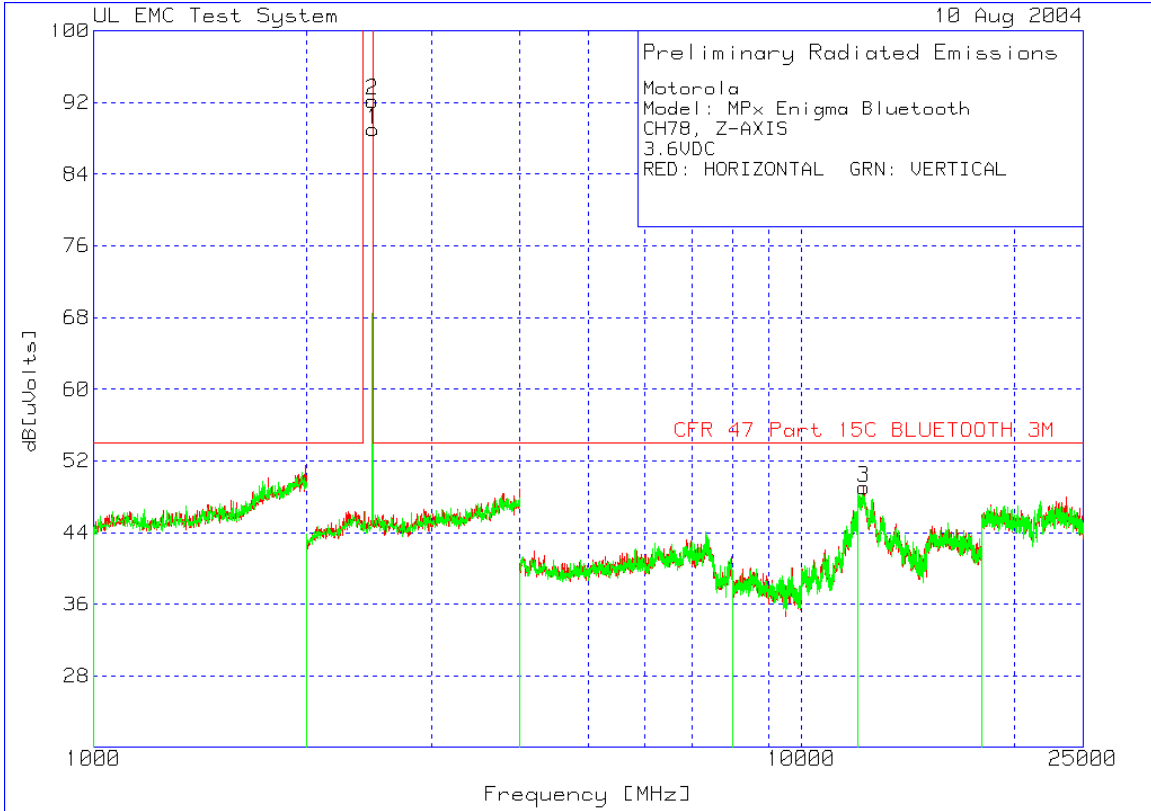
**1-25 GHz High-Channel Y-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH78, Y-AXIS  
 3.6VDC

RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2480.962	63.8 pk		3.3	22	89.1	999	-909.9	100	Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12018.018	51.23 pk		-41.5	39.4	49.13	54	-4.87	100	Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2480.962	68.81 pk		3.3	22	94.11	999	-904.89	100	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE



**1-25 GHz High-Channel Z-Orientation**

Motorola  
 Model: MPx Enigma Bluetooth  
 CH78, Z-AXIS  
 3.6VDC  
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
<b>2 - 4GHz 2000 - 4000MHz</b>										
1	2480.962	63.69	pk		3.3	22	88.99	999	-910.01	100 Horz
<b>12 - 18GHz 12000 - 18000MHz</b>										
3	12246.246	50.36	pk		-40.7	39.4	49.06	54	-4.94	100 Horz
<b>2 - 4GHz 2000 - 4000MHz</b>										
2	2476.954	66.93	pk		3.3	22	92.23	999	-906.77	99 Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M  
 LIMIT 2: NONE

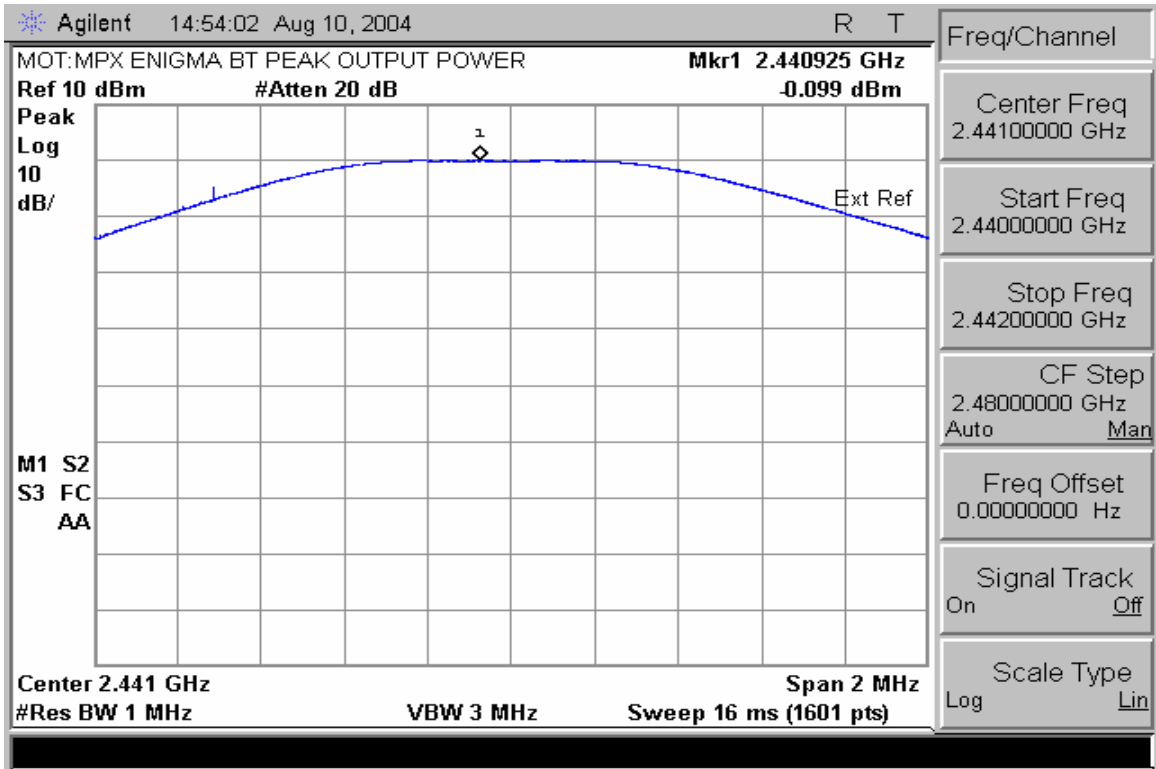
## PEAK OUTPUT POWER

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



**Peak Output Power**

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

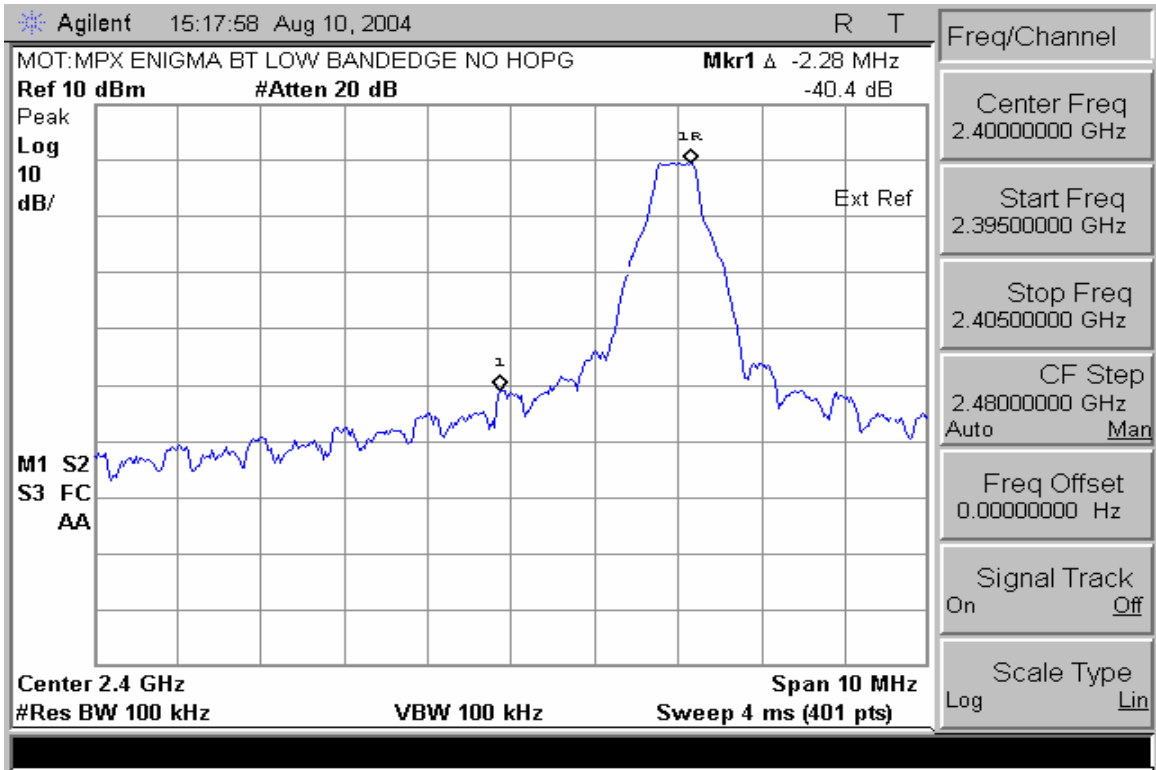
CFR 47 Part 15.247

### **Measurement Procedure**

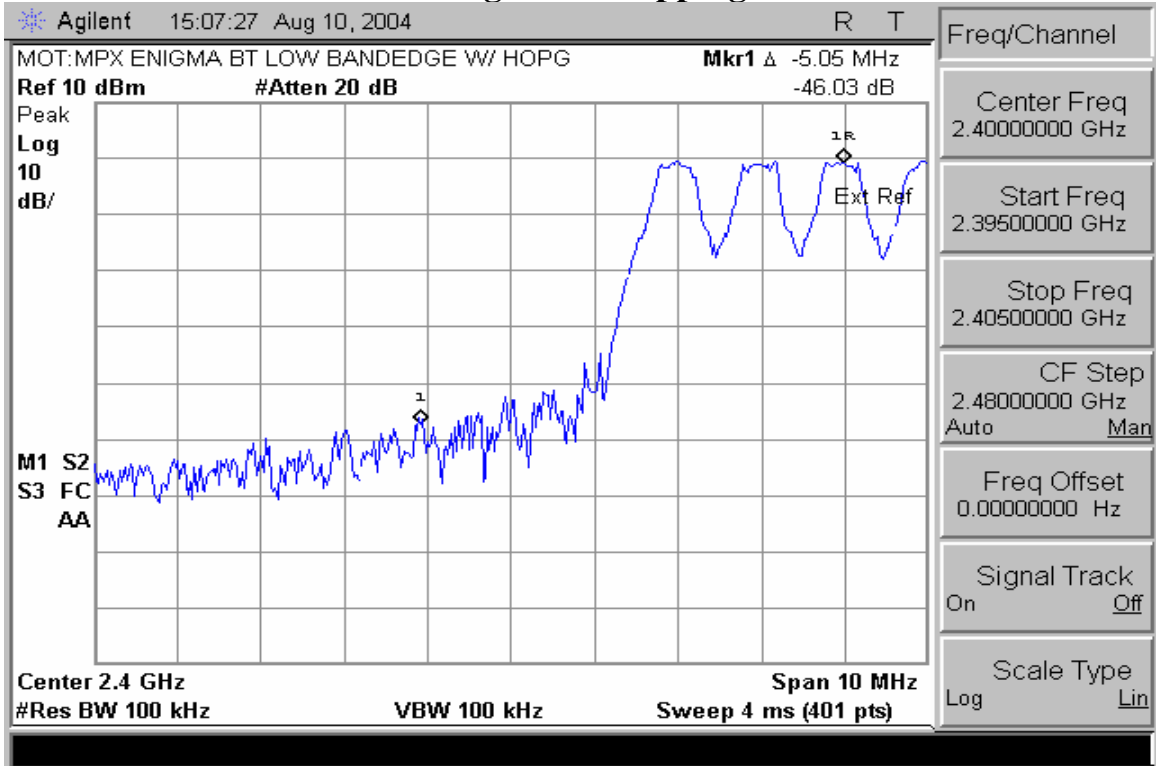
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

### **Measurement Results**

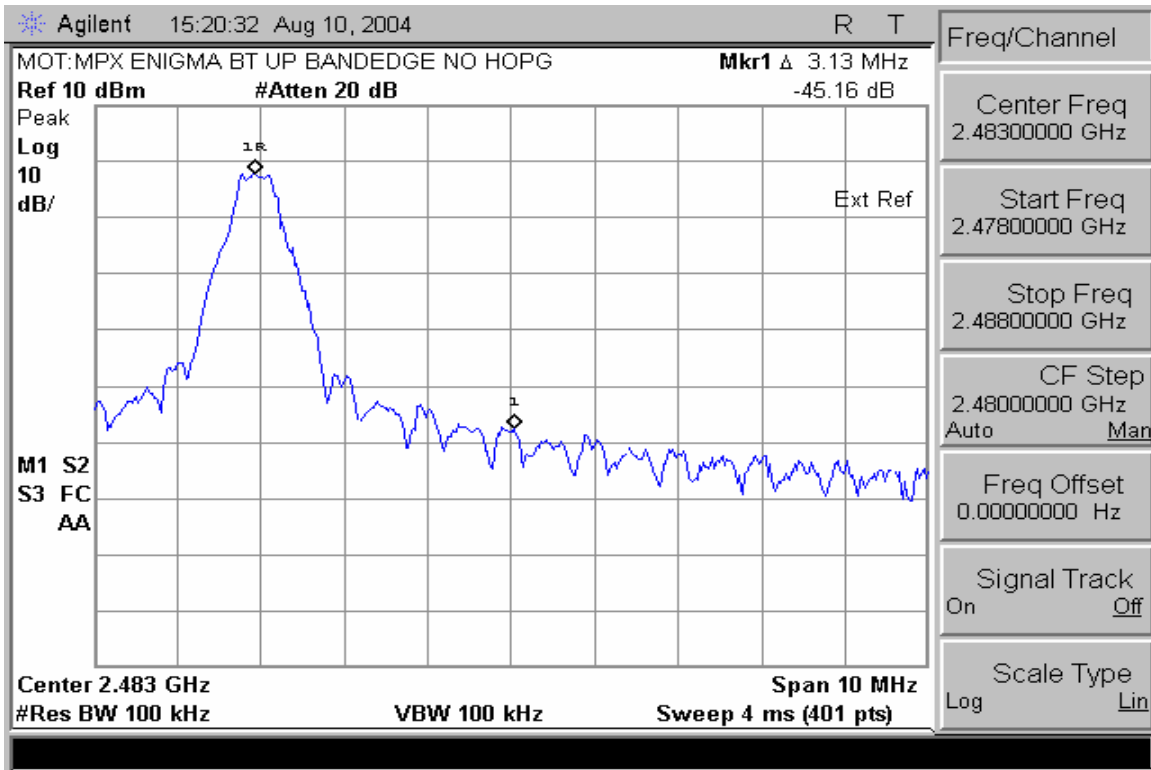
See Attached:



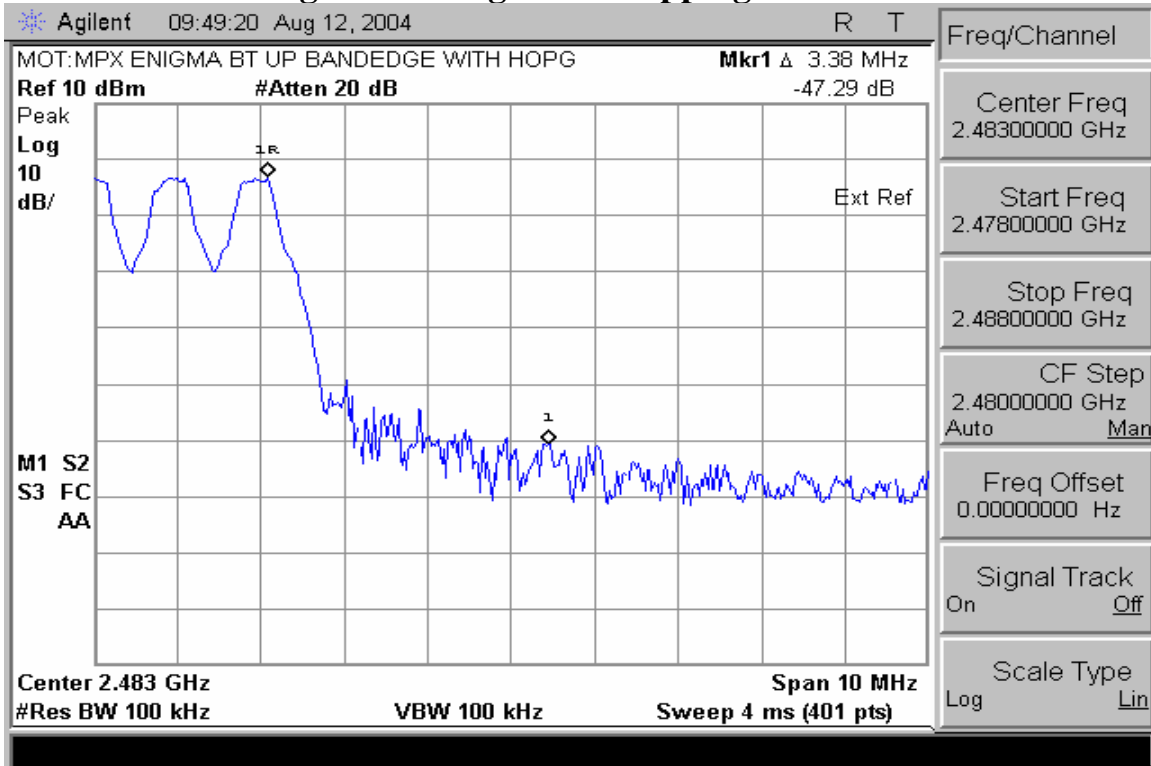
**Low Band Edge with Hopping Disabled**



**Low Band Edge with Hopping Enabled**



**High Band Edge with Hopping Disabled**



**High Band Edge with Hopping Enabled**



## **SPURIOUS RF CONDUCTED EMISSIONS**

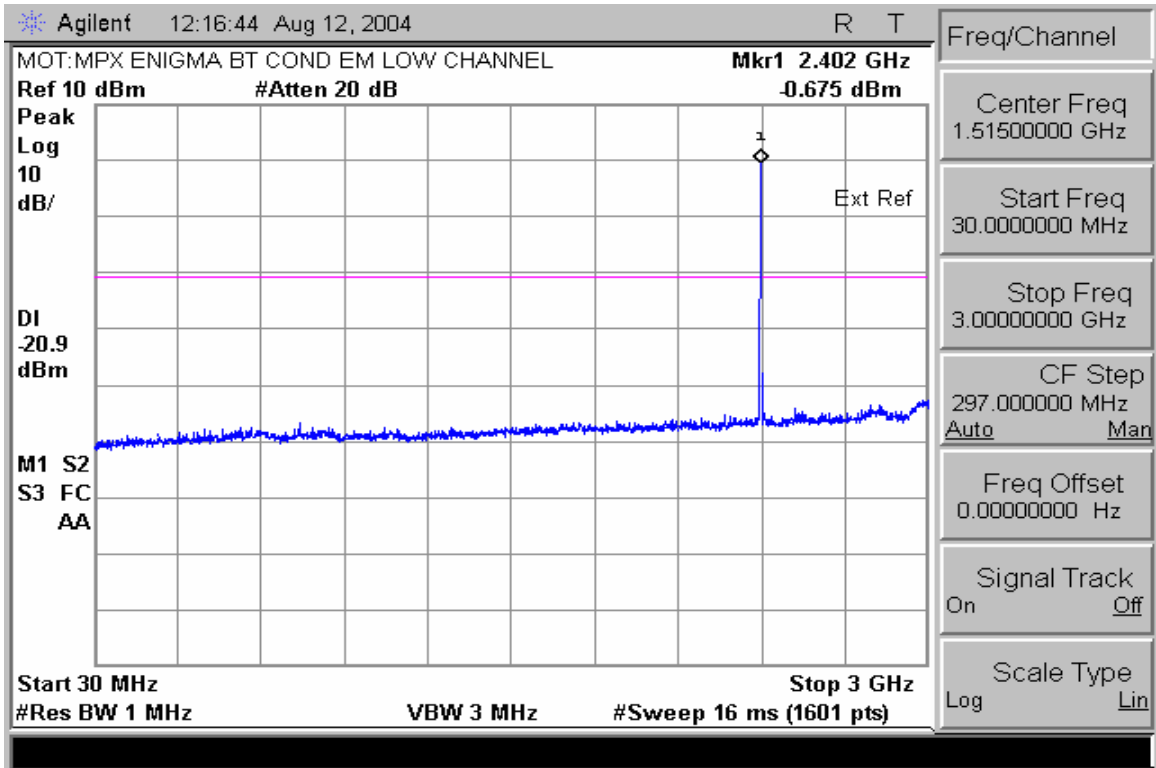
CFR 47 Part 15.247

### **Measurement Procedure**

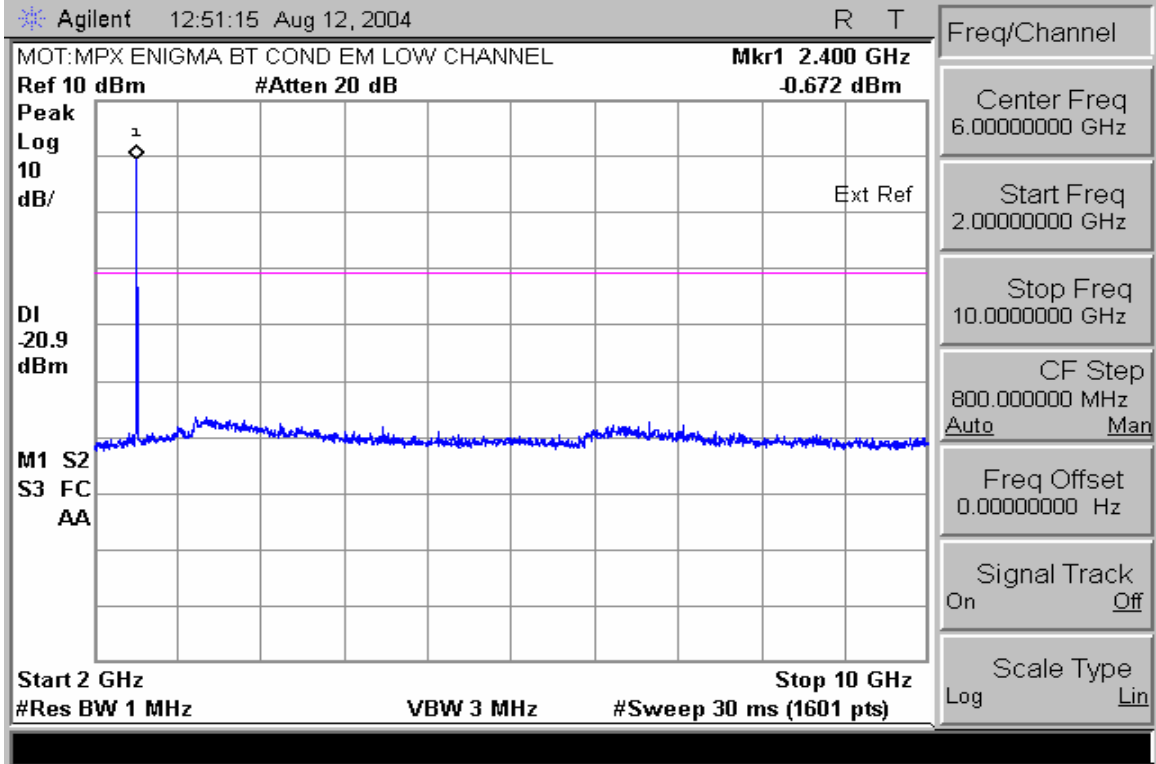
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

### **Measurement Results**

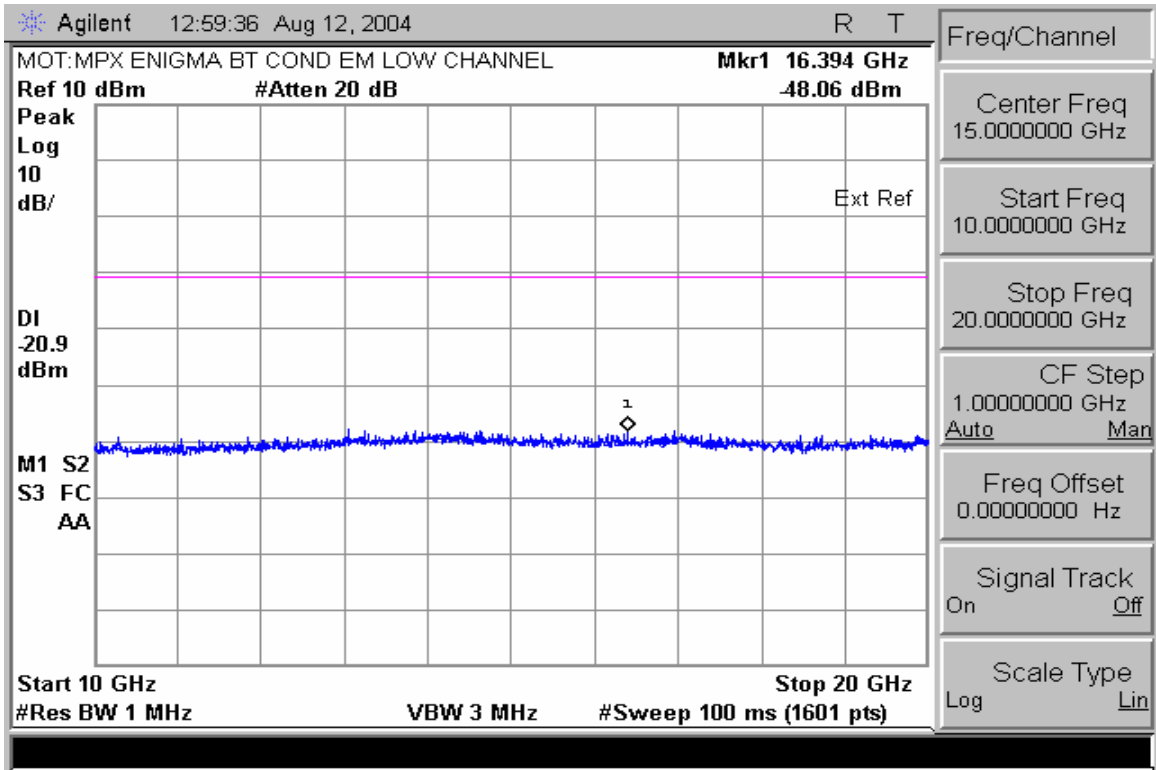
See attached:



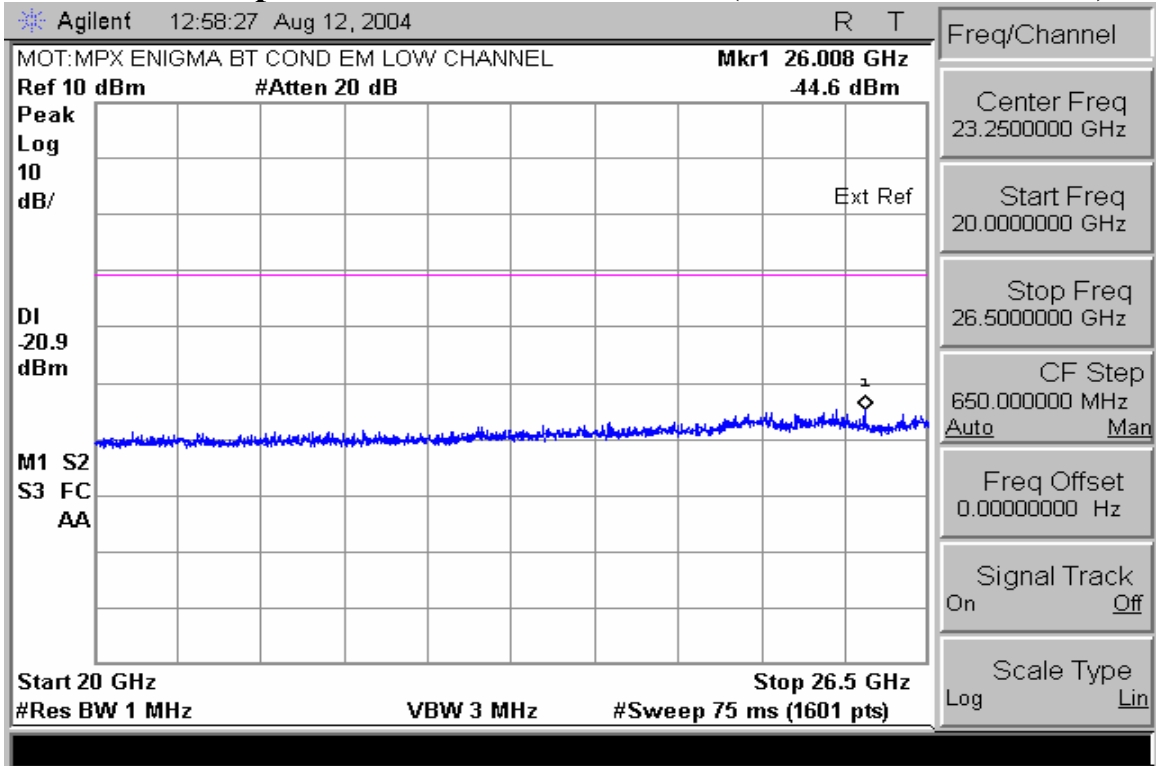
**Conducted Spurious Emissions 30-3000MHz (Low Channel Enabled)**



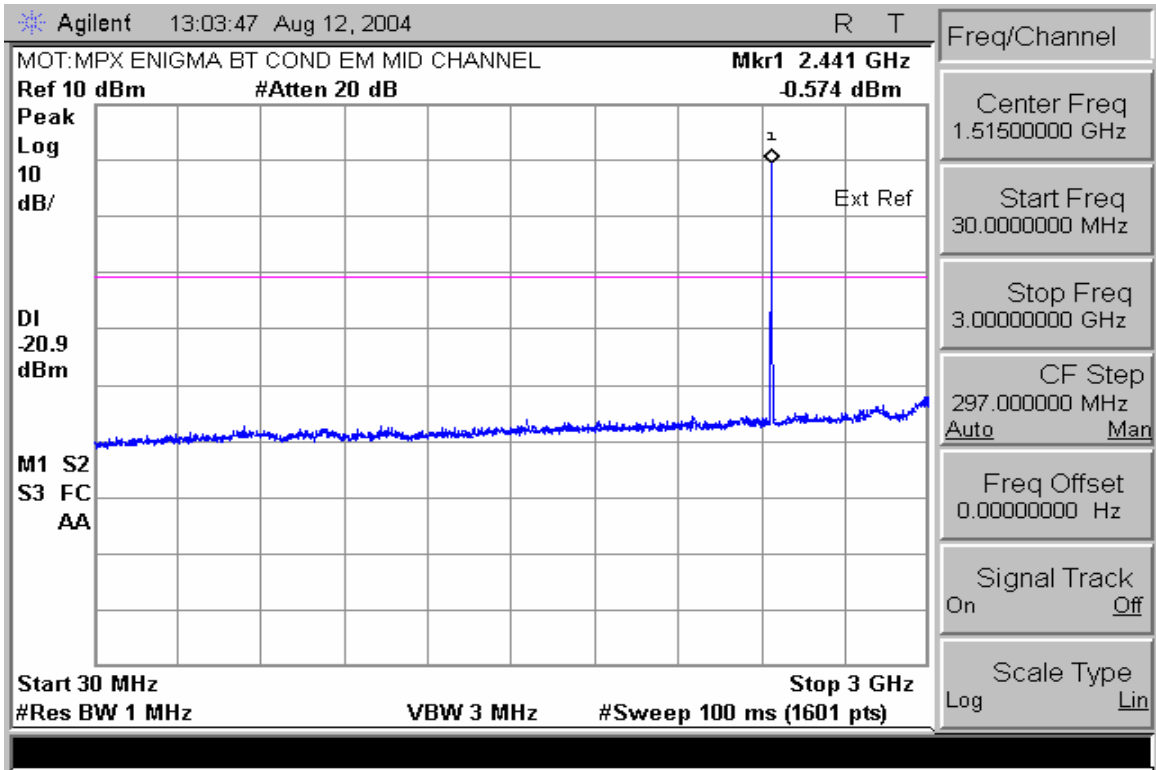
**Conducted Spurious Emissions 2-10GHz (Low Channel Enabled)**



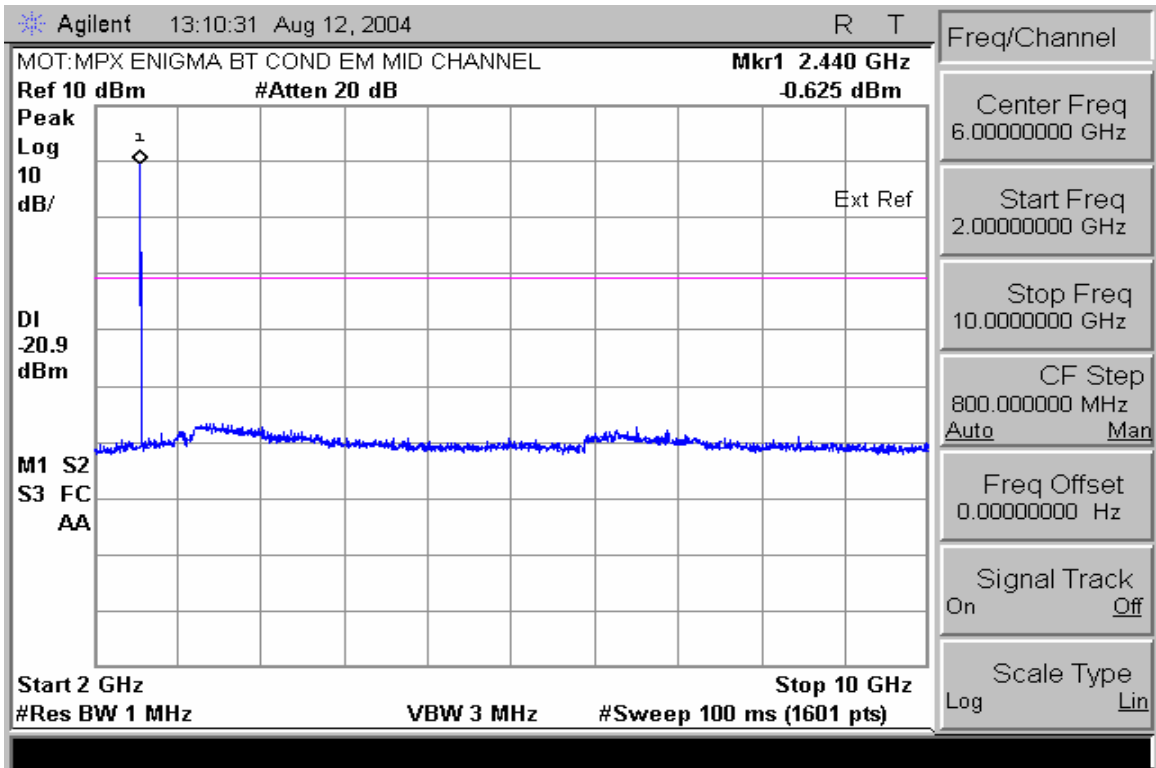
**Conducted Spurious Emissions 10-20GHz (Low Channel Enabled)**



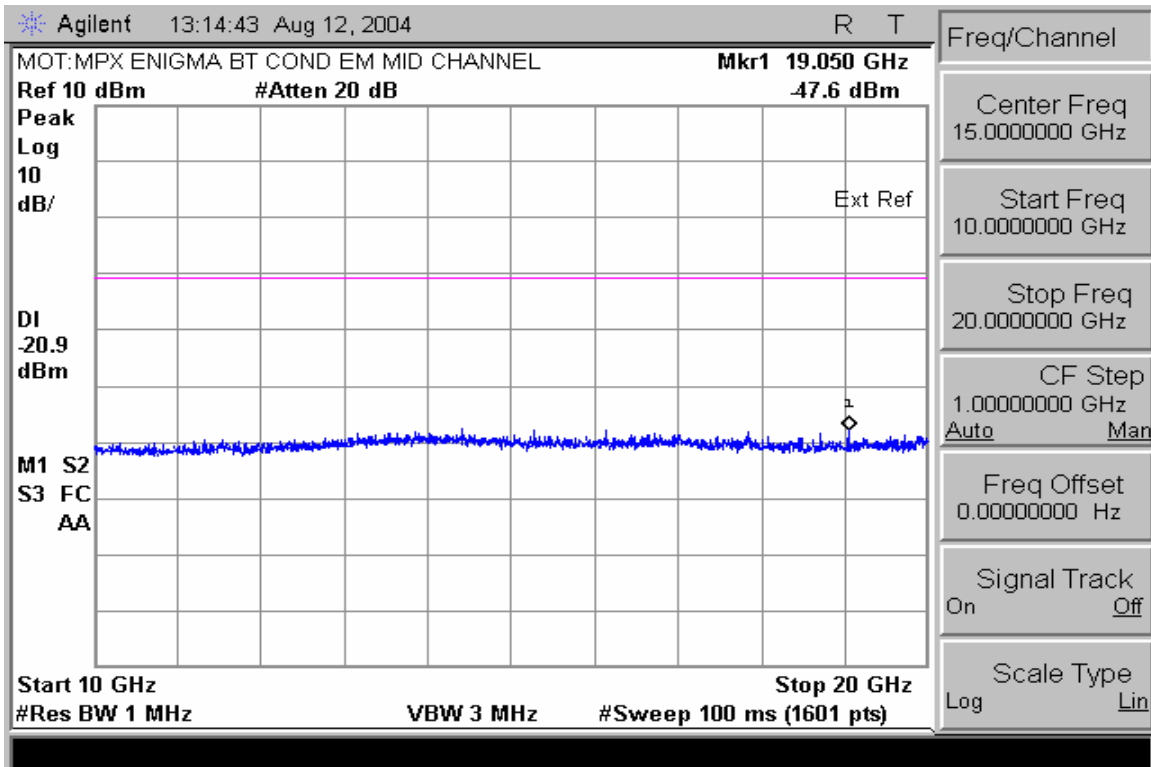
**Conducted Spurious Emissions 20-26.5GHz (Low Channel Enabled)**



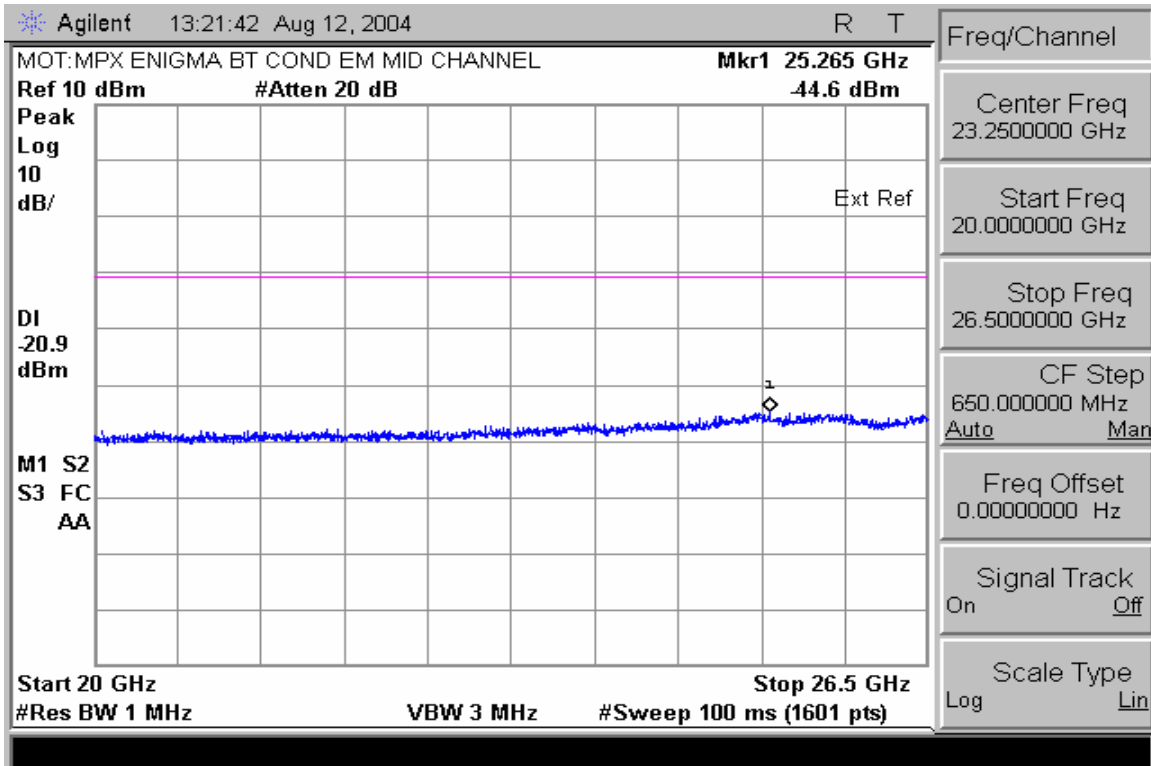
**Conducted Spurious Emissions 30-3000MHz (Mid Channel Enabled)**



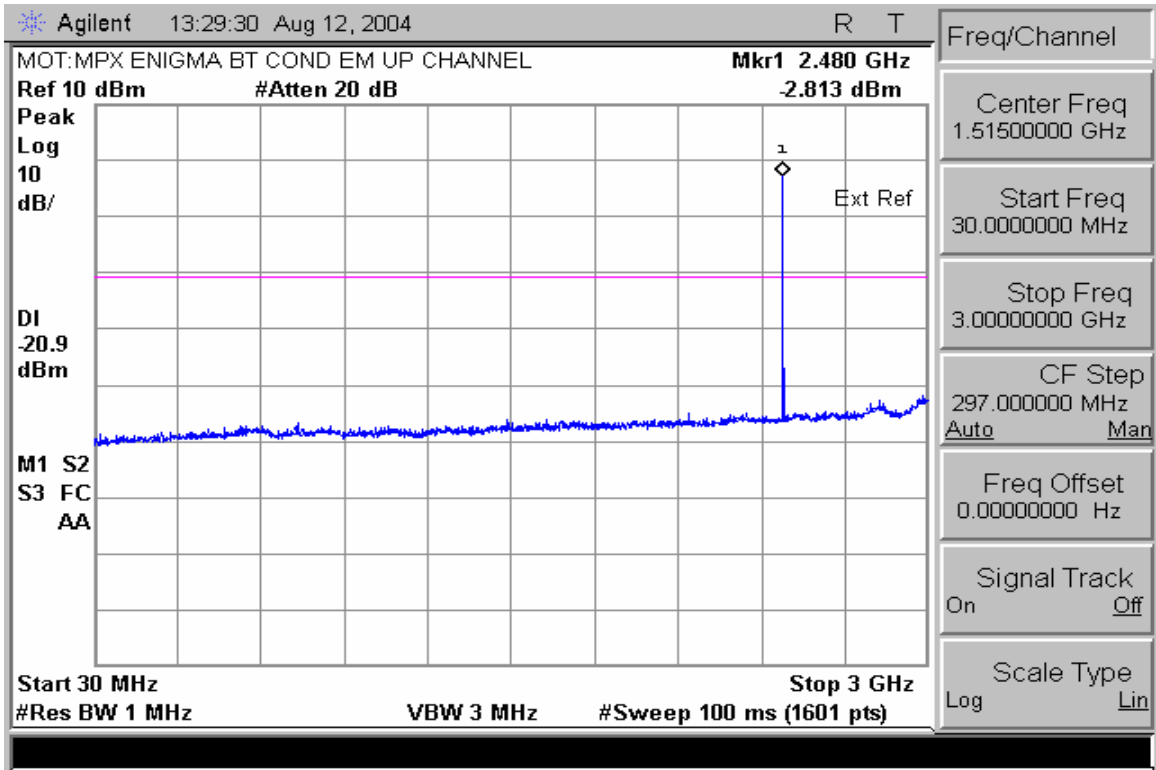
**Conducted Spurious Emissions 2-10GHz (Mid Channel Enabled)**



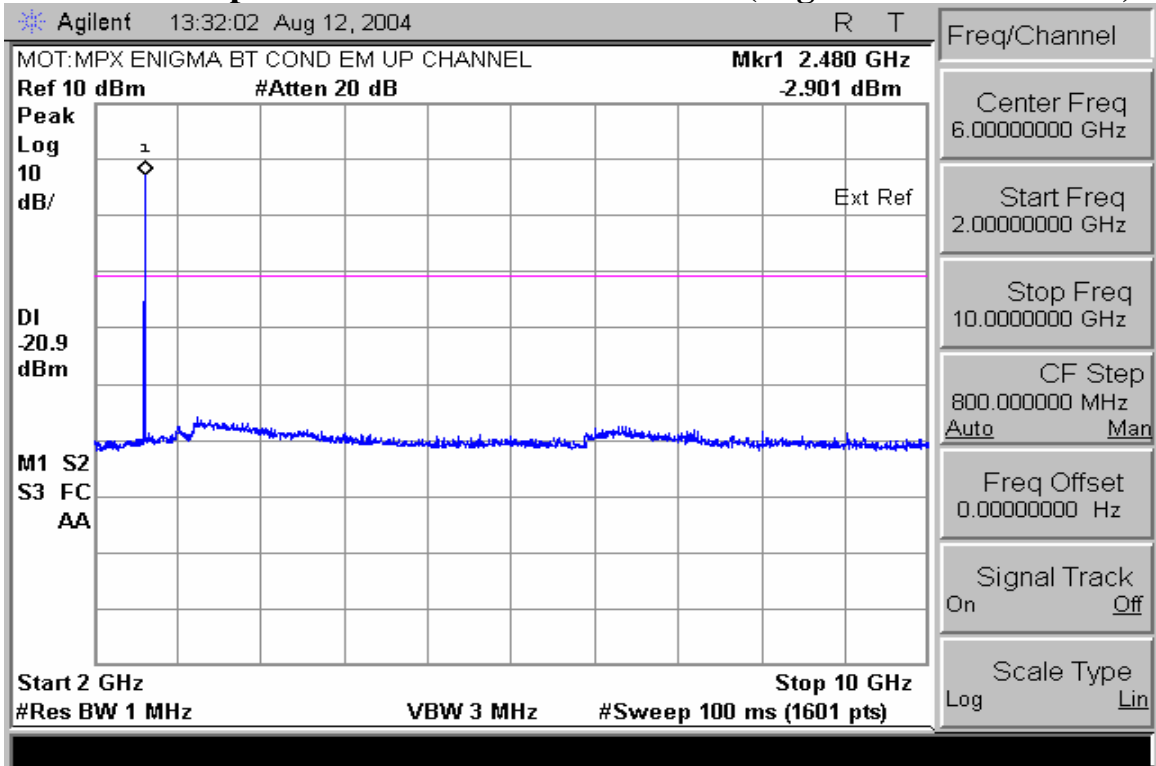
**Conducted Spurious Emissions 10-20GHz (Mid Channel Enabled)**



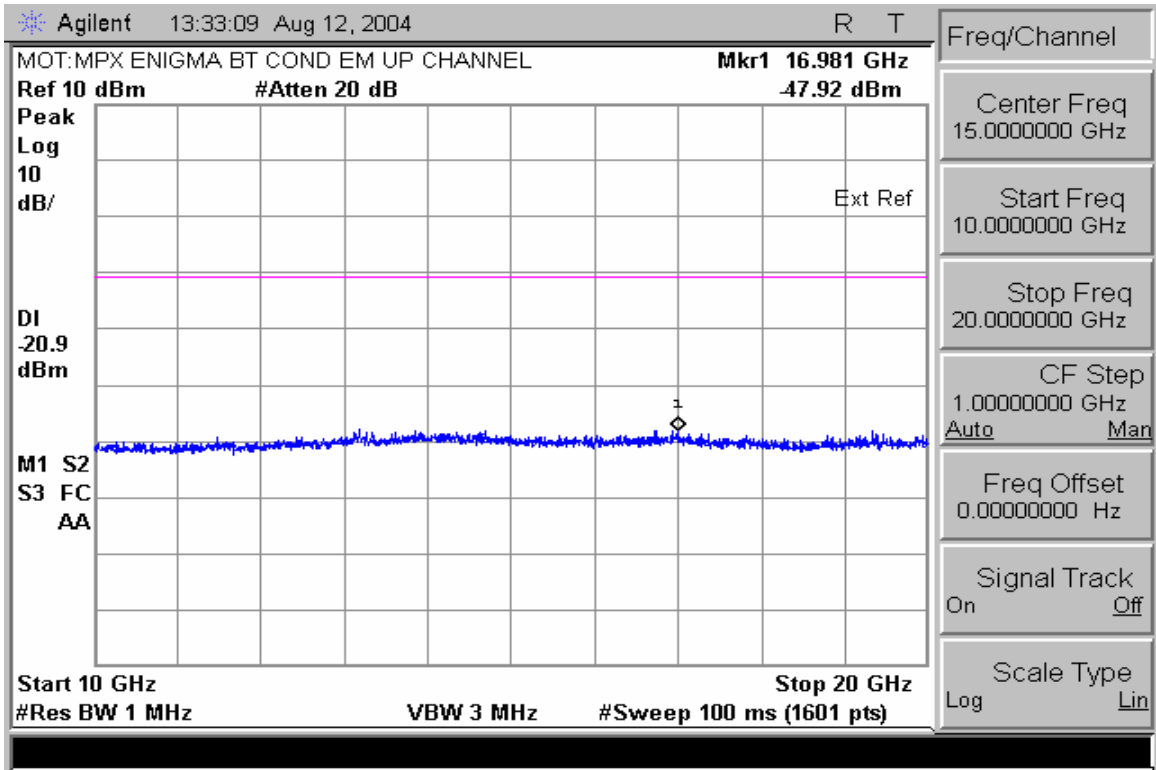
**Conducted Spurious Emissions 20-26.5GHz (Mid Chan Enabled)**



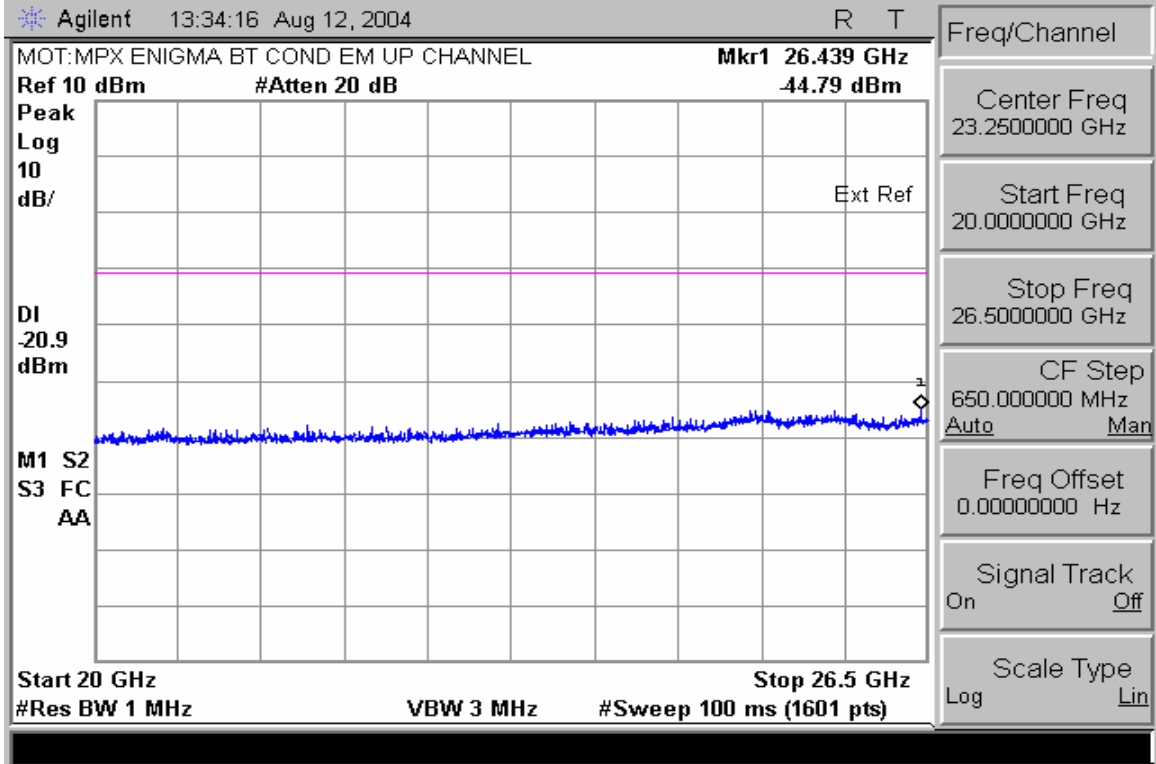
**Conducted Spurious Emissions 30-3000MHz (High Channel Enabled)**



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



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



**Conducted Spurious Emissions 20-26.5GHz (High Chan Enabled)**

**End of Test Report**