

PERSONAL COMMUNICATIONS SECTOR

**PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY**

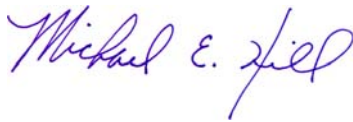
EMC TEST REPORT - Addendum

Test Report Number – 14065-1BT

Report Date – June 9, 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.

Signature: 

Name: Michael E. Hill

Title: Senior Electrical Engineer

Date : 2004-06-09

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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 1900, GSM 850, Bluetooth (Class II)

Model Number: MpX220

Serial Numbers: MDSL4404130197, MDSL4403160563

Testing Complete Date: June 09, 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	1.00MHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.92 ms
4	20 dB Bandwidth	830 kHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	-2.01 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 Name	Item Name Description	Model #	Serial Number	Calibration Due Date
Hewlett Packard	Spectrum Analyzer, EMC	E7405	US39440191	4/12/2005
Agilent	Power Meter	4418B	GB40206388	05/12/2004
Agilent	Power Sensor	E4412A	US38486321	05/12/2004
Hewlett Packard	Signal Generator	83623B	3844A00935	19/05/2005
Rohde Schwartz	Receiver, EMI Test	ESI26	100001/026	12/11/2004
UL Test Equipment				
Hewlett Packard	QP Adapter	85650A	2811A01069	1/08/2005
Hewlett Packard	S/A Display	8566B	2542A12974	1/08/2005
Hewlett Packard	S/A	8566B	2637A03376	1/08/2005
Hewlett Packard	RF Preselector	85685A	2810A00692	1/08/2005
Rohde & Schwarz	S/A	FSEK20	DE2525315	1/09/2005
EMCO	Horn Antenna 1-18GHz	3115	2638	7/10/2004
EMCO	Horn Antenna 18-26.5GHz	3160-09	9904-1165	N/A*
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	6/23/2004
Chase	Log-Periodic Antenna	UPA6108	1120	6/23/2004

* Per ANSI C63.5-1998 (Revision of ANSI C63.5-1988) pg. 6, under 5.1 General "It is unnecessary to calibrate standard gain horn antennas for use above 1GHz; rather, they are used as gain standards to calibrate other antennas (see 12.3.1 of IEEE Std 149-1979)."

All equipment is on a one-year calibration cycle.

Description of Bluetooth Transmitter

The V3 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 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.

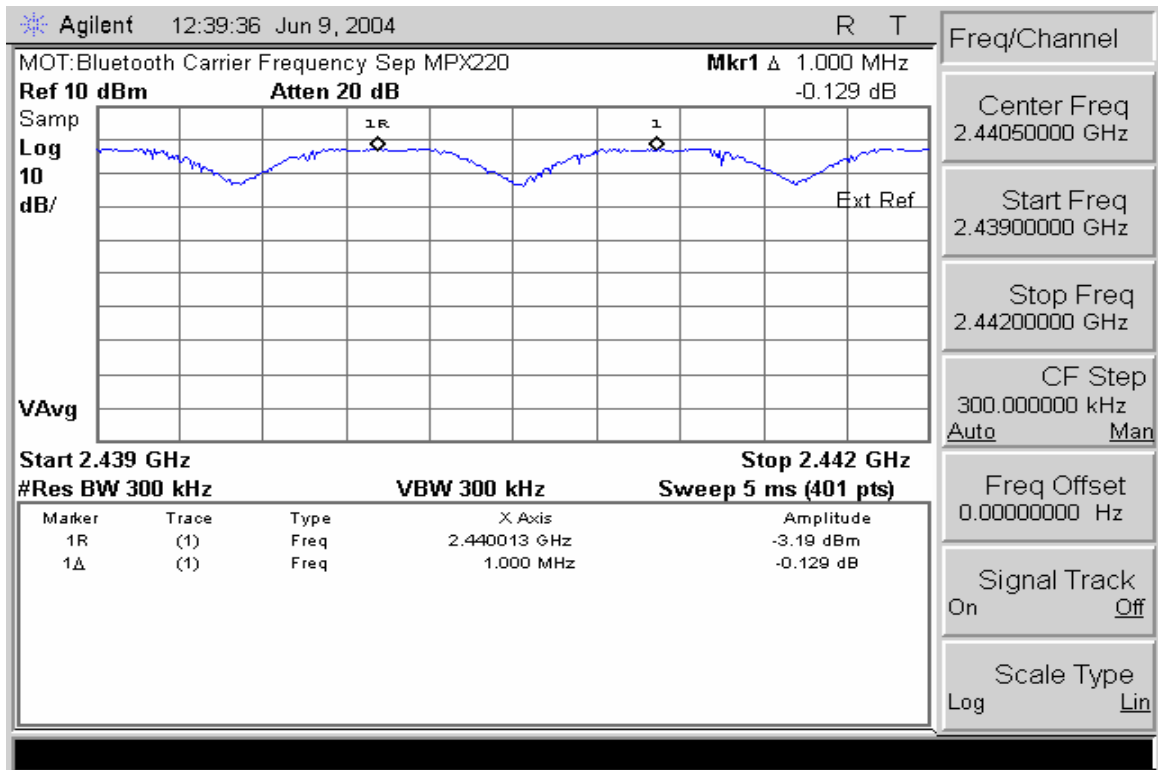
The Bluetooth transmitter of the V3 had its hopping function enabled. The following spectrum analyzer settings were used:

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.

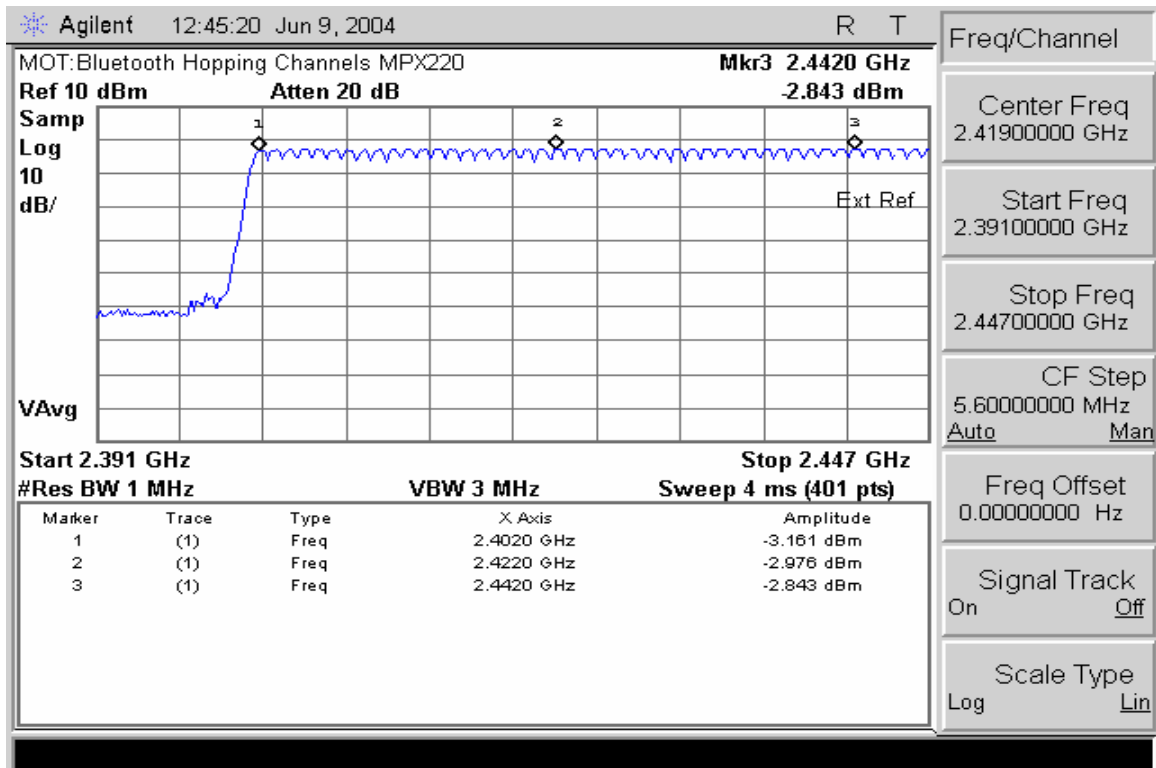
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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

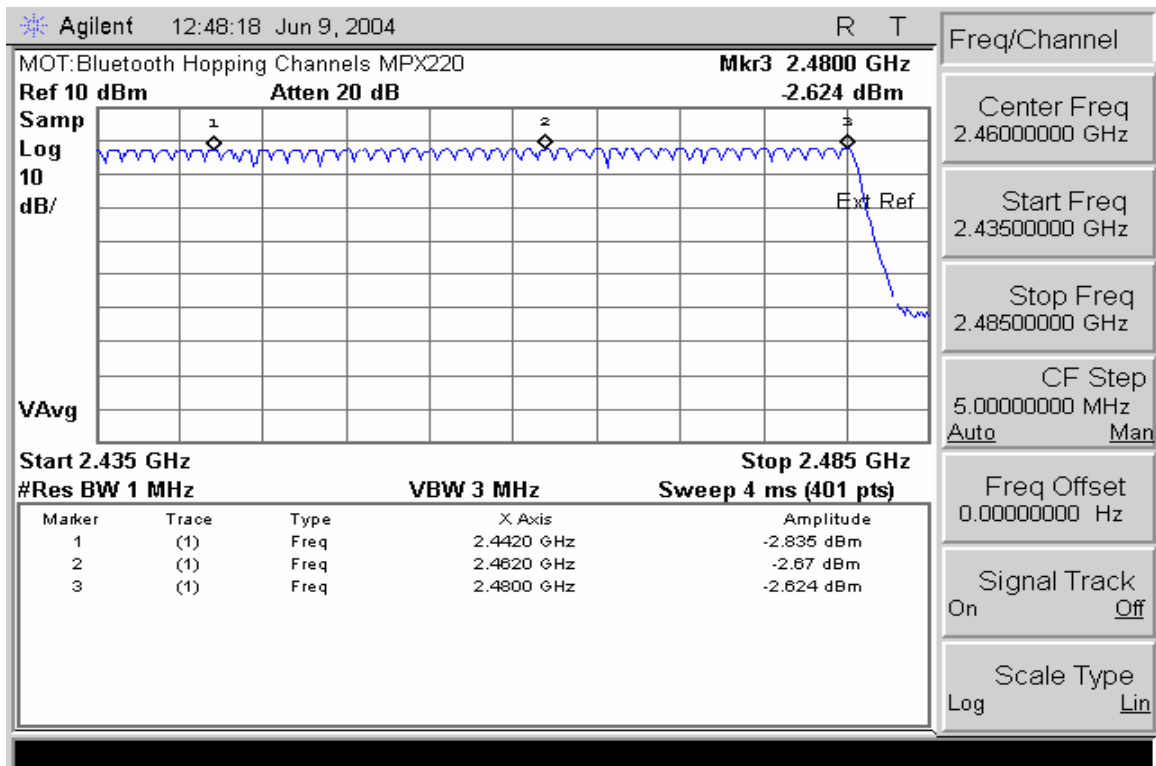
The trace was allowed to stabilize.

Measurement Results

See attached.



Number of Hopping Frequencies (Channels 0 – 40)



Number of Hopping Frequencies (Channels 40 – 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.

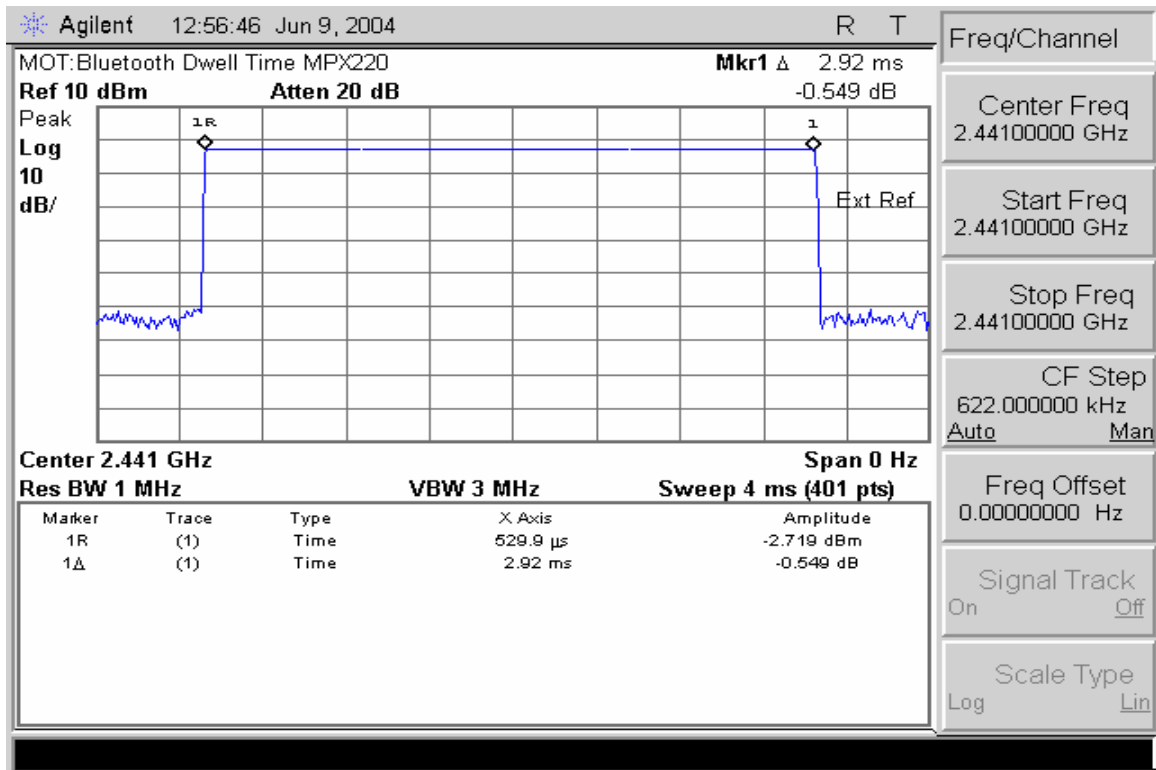
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

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

Attached



Dwell Time

As defined in DA 0075, dwell time is used to calculate a Duty Cycle Correction Factor for radiated emissions:

$$DCCF = 20 \log [(dwell\ time)/100ms] = 20 \log [2.92ms/100ms] = -30.7$$

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.

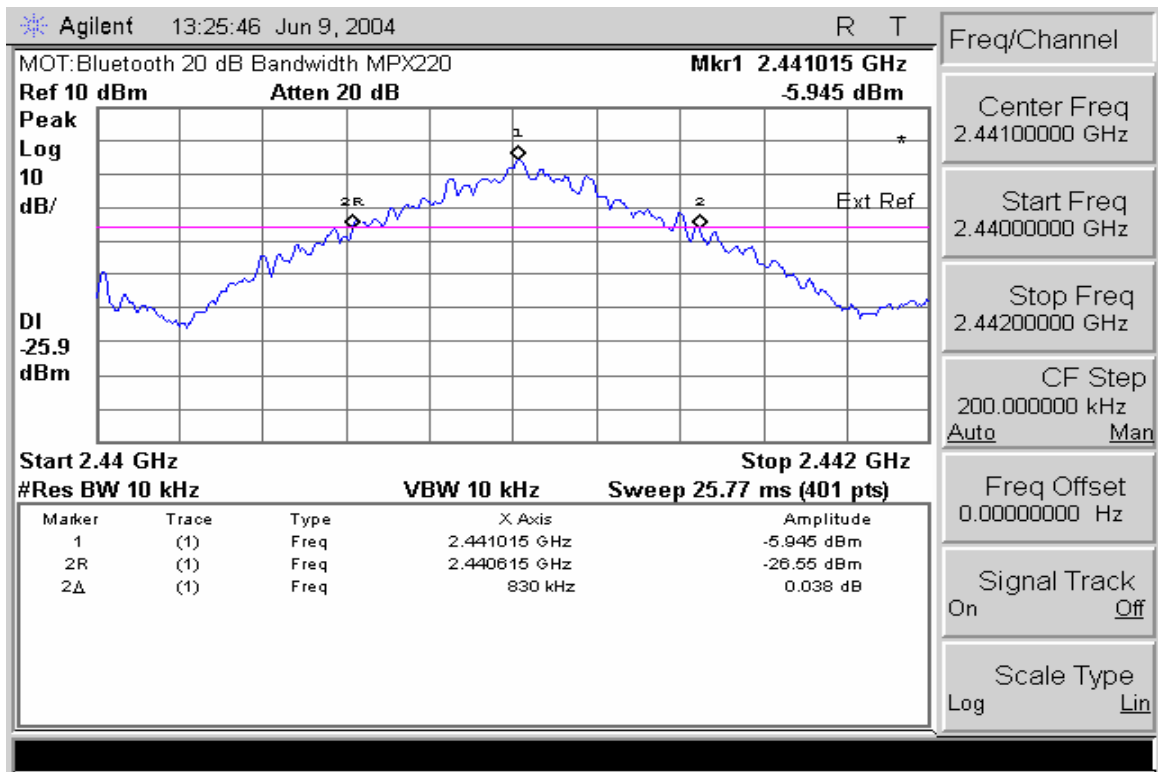
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW $\geq$ 1% of the 20dB bandwidth
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



FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR47 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.

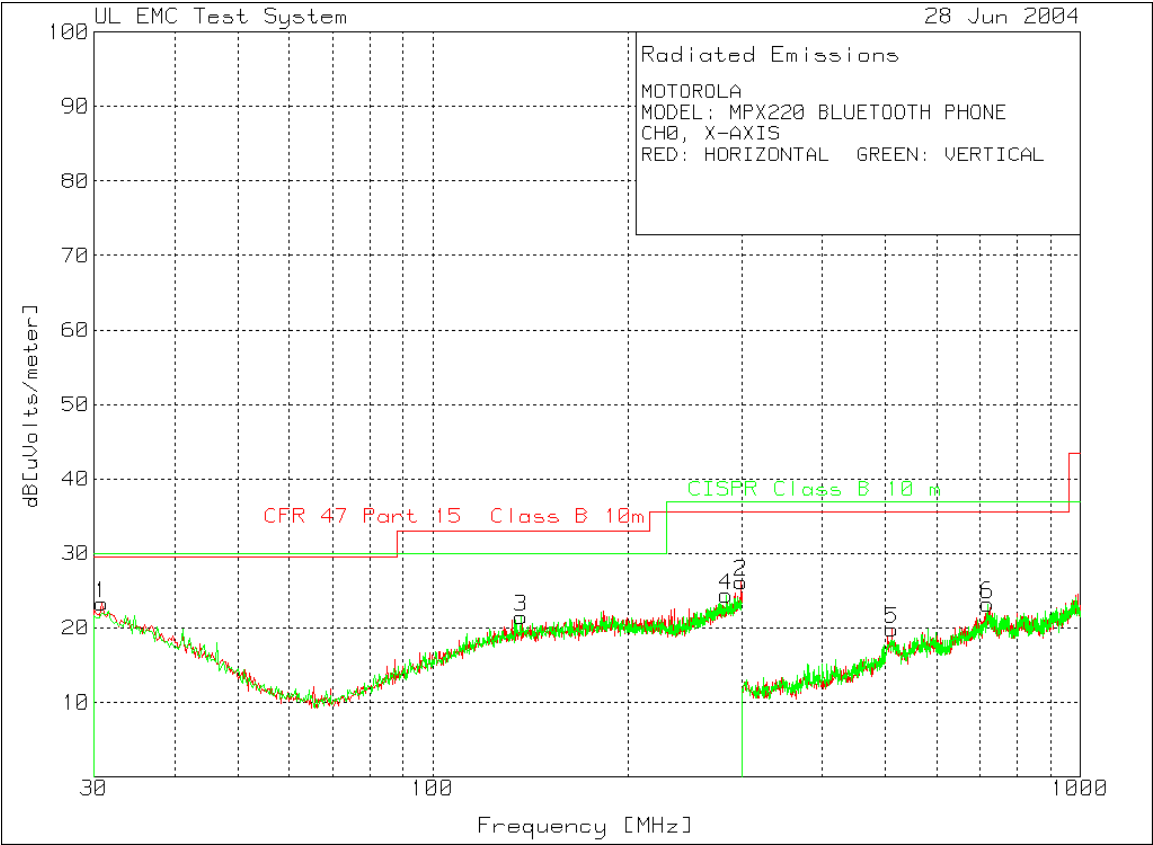
Field Strength (dBuV/m) = EMI Receiver Level (dBuV) + Cable Loss (dB) -
Amplifier Gain (dB) + Antenna Correction Factor (1/m)

A fully charged battery was used for the supply voltage.

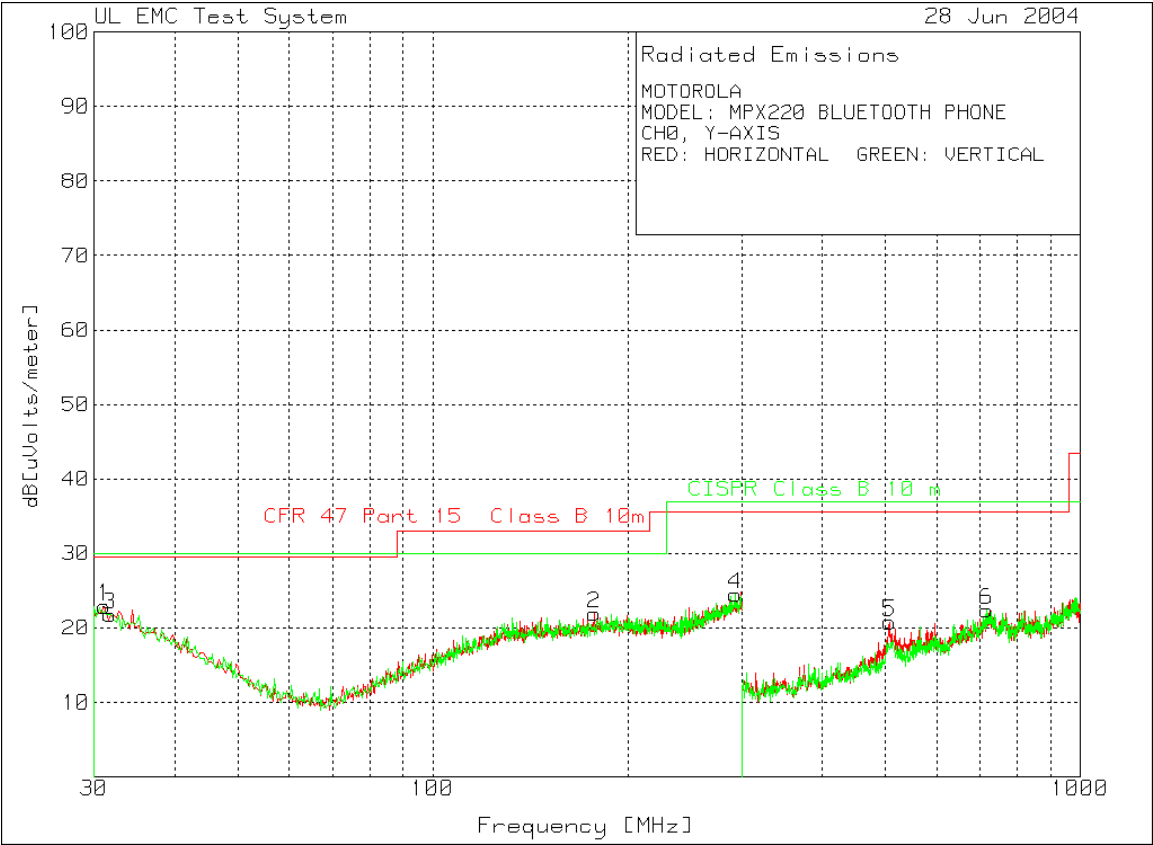
This data was taken at Underwriter's Laboratories.

Measurement Results

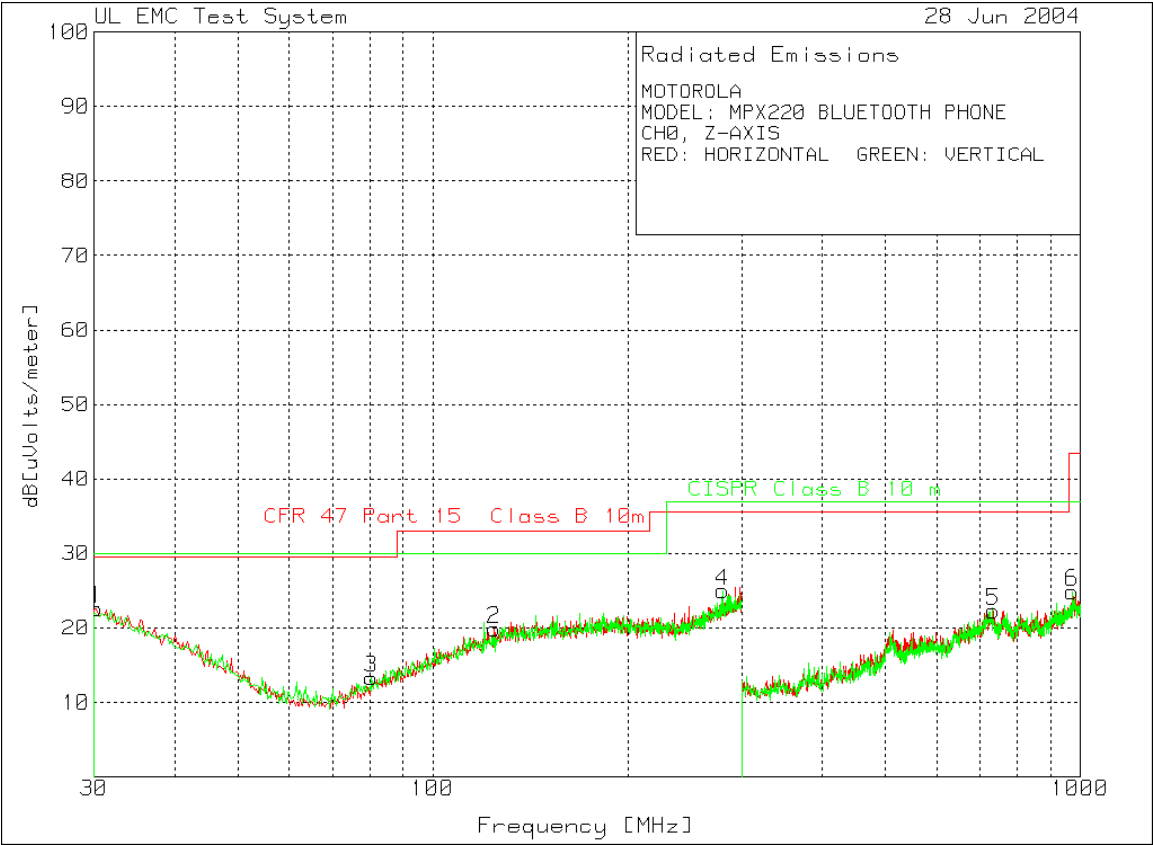
Attached



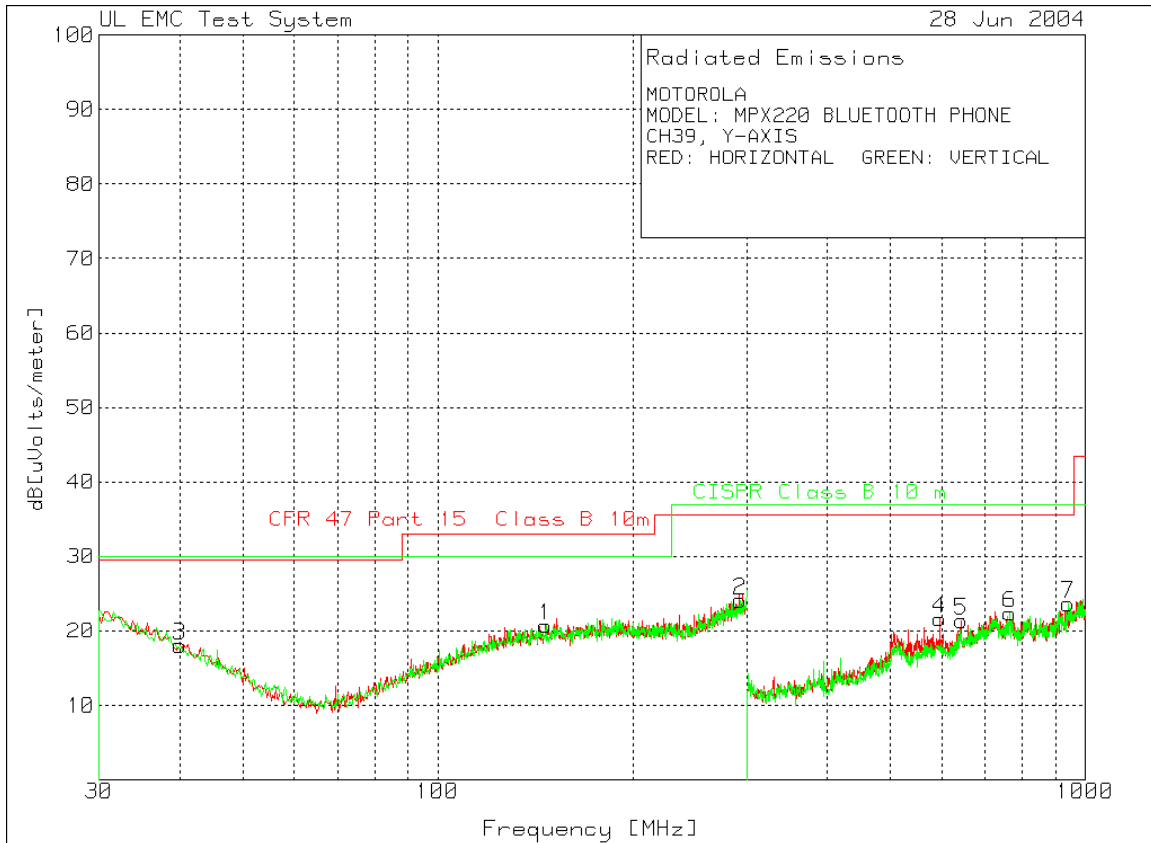
MOTOROLA													
MODEL: MPX220 BLUETOOTH PHONE													
CH0, X-AXIS													
RED: HORIZONTAL				GREEN: VERTICAL									
Marker	Test	Meter	Detector	Gain/Loss	Transducer	Level	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Azimuth [deg]	Height [cm]	Polarity
Number	Frequency	Reading	Type	Factor	Factor								
	[MHz]	[dB(uV)]		[dB]	[dB]	dB[uVolts/meter]							
Range: 1 30 - 300MHz													
1	30.81	32.6 pk		-26.9	17.6	23.3	29.6	-6.3	30	-6.7	353	101	Horz
2	299.73	33.1 pk		-25.6	18.7	26.2	35.6	-9.4	37	-10.8	56	101	Horz
Range: 2 30 - 300MHz													
3	136.92	33.1 pk		-26.6	15	21.5	33.1	-11.6	30	-8.5	8	101	Vert
4	283.8	32.2 pk		-25.7	17.9	24.4	35.6	-11.2	37	-12.6	36	101	Vert
Range: 3 300 - 1000MHz													
5	511.4	32.6 pk		-31.8	19	19.8	35.6	-15.8	37	-17.2	80	101	Horz
Range: 4 300 - 1000MHz													
6	718.6	32.4 pk		-31.3	22.1	23.2	35.6	-12.4	37	-13.8	49	101	Vert
LIMIT 1: CFR 47 Part 15 Class B 10m													



MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH0, Y-AXIS RED: HORIZONTAL GREEN: VERTICAL												
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[c Azimuth [deg]]	Height [cm]	Polarity
Range: 1 30 - 300MHz												
1	31.08	32.2 pk		-26.9	17.6	22.9	29.6	-6.7	30	-7.1	17	101 Horz
2	177.42	32.4 pk		-26.4	15.9	21.9	33.1	-11.2	30	-8.1	324	101 Horz
Range: 2 30 - 300MHz												
3	31.755	31.4 pk		-26.9	17.3	21.8	29.6	-7.8	30	-8.2	271	101 Vert
4	293.52	31.9 pk		-25.6	18.2	24.5	35.6	-11.1	37	-12.5	170	101 Vert
Range: 3 300 - 1000MHz												
5	507.2	34 pk		-31.9	18.7	20.8	35.6	-14.8	37	-16.2	172	101 Horz
Range: 4 300 - 1000MHz												
6	716.5	31.3 pk		-31	22.1	22.4	35.6	-13.2	37	-14.6	48	101 Vert
LIMIT 1: CFR 47 Part 15 Class B 10m												



MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH0, Z-AXIS RED: HORIZONTAL GREEN: VERTICAL													
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Azimuth [deg]	Height [cm]	Polarity
Range: 1 30 - 300MHz													
1	30.27	31.6 pk		-26.9	17.9	22.6	29.6	-7	30	-7.4	4	96	Horz
2	124.5	32.2 pk		-26.6	14.3	19.9	33.1	-13.2	30	-10.1	357	96	Horz
Range: 2 30 - 300MHz													
3	80.49	31.9 pk		-26.7	8.1	13.3	29.6	-16.3	30	-16.7	68	101	Vert
4	280.29	33 pk		-25.7	17.7	25	35.6	-10.6	37	-12	236	101	Vert
Range: 3 300 - 1000MHz													
5	734	31.9 pk		-31.4	21.8	22.3	35.6	-13.3	37	-14.7	104	99	Horz
Range: 4 300 - 1000MHz													
6	971.3	32.1 pk		-31.3	24.1	24.9	43.5	-18.6	37	-12.1	327	101	Vert
LIMIT 1: CFR 47 Part 15 Class B 10m LIMIT 2: CISPR Class B 10m													



30 -1000MHz Mid-Channel Dual Polarization Y-Orientation

MOTOROLA
MODEL: MPX220 BLUETOOTH PHONE
CH39, Y-AXIS
RED: HORIZONTAL GREEN: VERTICAL

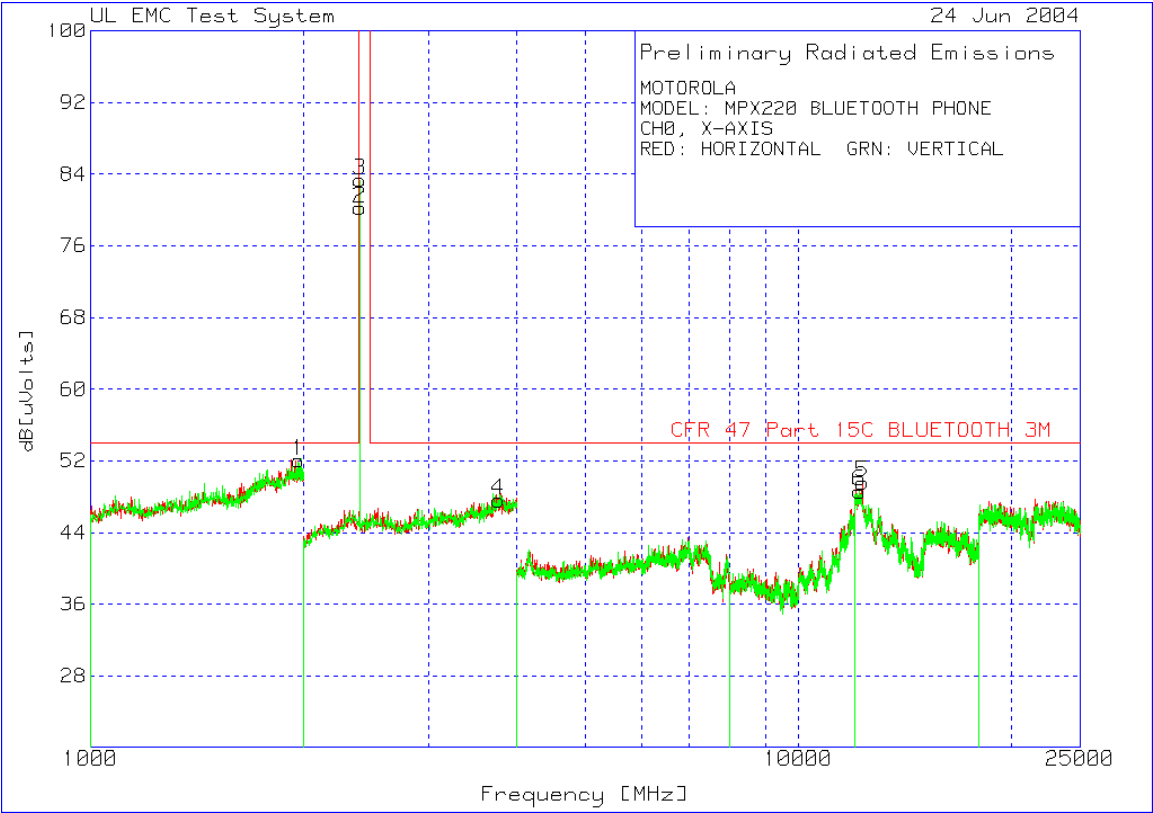
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB[uVolts/meter]]	Limit 1 [dB[uVolts/meter]]	Margin 1[dB]	Limit 2	Margin 2[dB]	Azimuth [deg]	Height [cm]	Polarity
Range: 1 30 - 300MHz													
1	146.64	32.1 pk		-26.6	15.2	20.7	33.1	-12.4	30	-9.3	352	101	Horz
Range: 2 30 - 300MHz													
2	293.25	31.5 pk		-25.6	18.2	24.1	35.6	-11.5	37	-12.9	69	101	Vert
3	39.99	31.2 pk		-26.9	13.8	18.1	29.6	-11.5	30	-11.9	240	101	Vert
Range: 3 300 - 1000MHz													
4	596.1	34.4 pk		-31.5	18.7	21.6	35.6	-14	37	-15.4	172	101	Horz
5	643.7	32.7 pk		-31.3	20	21.4	35.6	-14.2	37	-15.6	358	101	Horz
Range: 4 300 - 1000MHz													
6	765.5	32.3 pk		-31.4	21.5	22.4	35.6	-13.2	37	-14.6	186	101	Vert
7	941.2	32.2 pk		-31.8	23.3	23.7	35.6	-11.9	37	-13.3	232	101	Vert

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



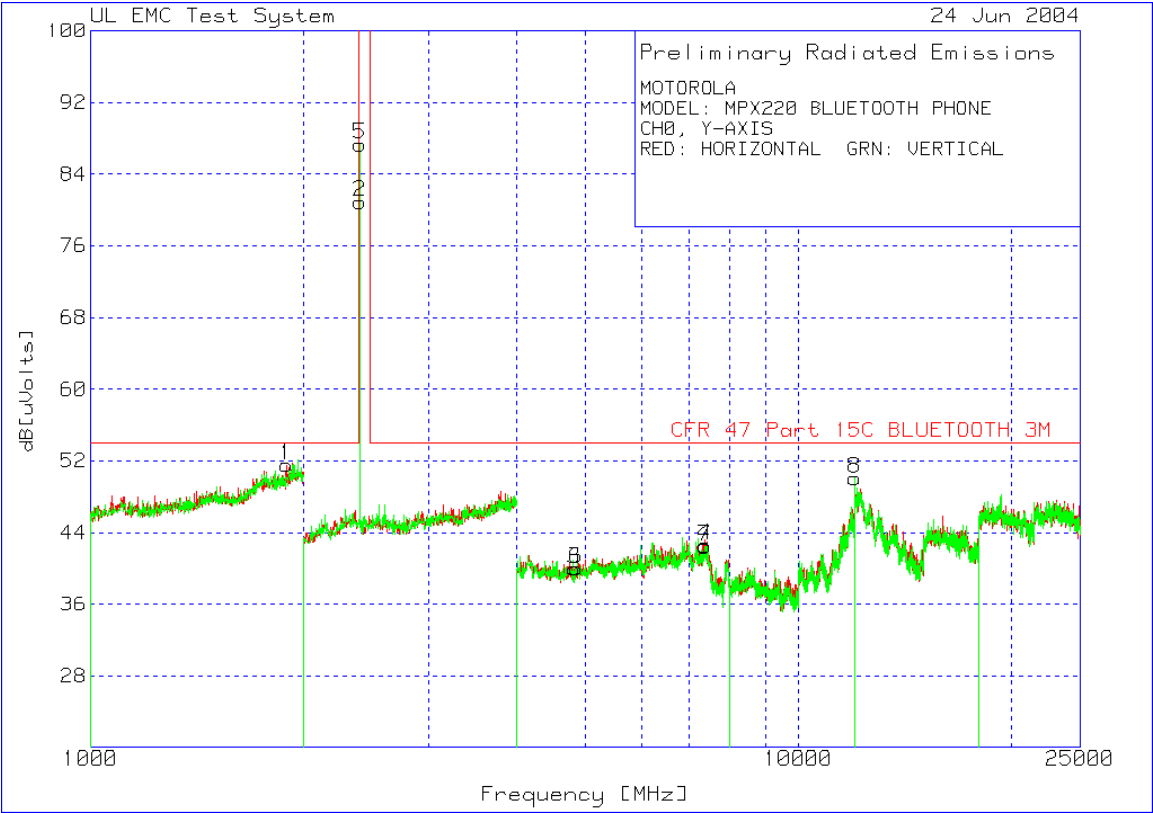
30 -1000MHz High Channel Dual Polarization Y-Orientation

MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH78, Y-AXIS RED: HORIZONTAL GREEN: VERTICAL											
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Azimuth [deg], Height [cm] Polarity
Range: 1 30 - 300MHz											
1	236.01	33.7	pk	-26	15.3	23	35.6	-12.6	37	-14	55 101 Horz
Range: 2 30 - 300MHz											
2	160.68	33.3	pk	-26.5	15.4	22.2	33.1	-10.9	30	-7.8	272 101 Vert
Range: 3 300 - 1000MHz											
3	533.1	34.8	pk	-31.8	17.5	20.5	35.6	-15.1	37	-16.5	358 101 Horz
4	856.5	31.7	pk	-31.8	22.4	22.3	35.6	-13.3	37	-14.7	334 101 Horz
Range: 4 300 - 1000MHz											
5	724.9	31.9	pk	-31.3	22.5	23.1	35.6	-12.5	37	-13.9	279 101 Vert
6	970.6	31.9	pk	-31.3	24	24.6	43.5	-18.9	37	-12.4	209 101 Vert
LIMIT 1: CFR 47 Part 15 Class B 10m LIMIT 2: CISPR Class B 10 m											



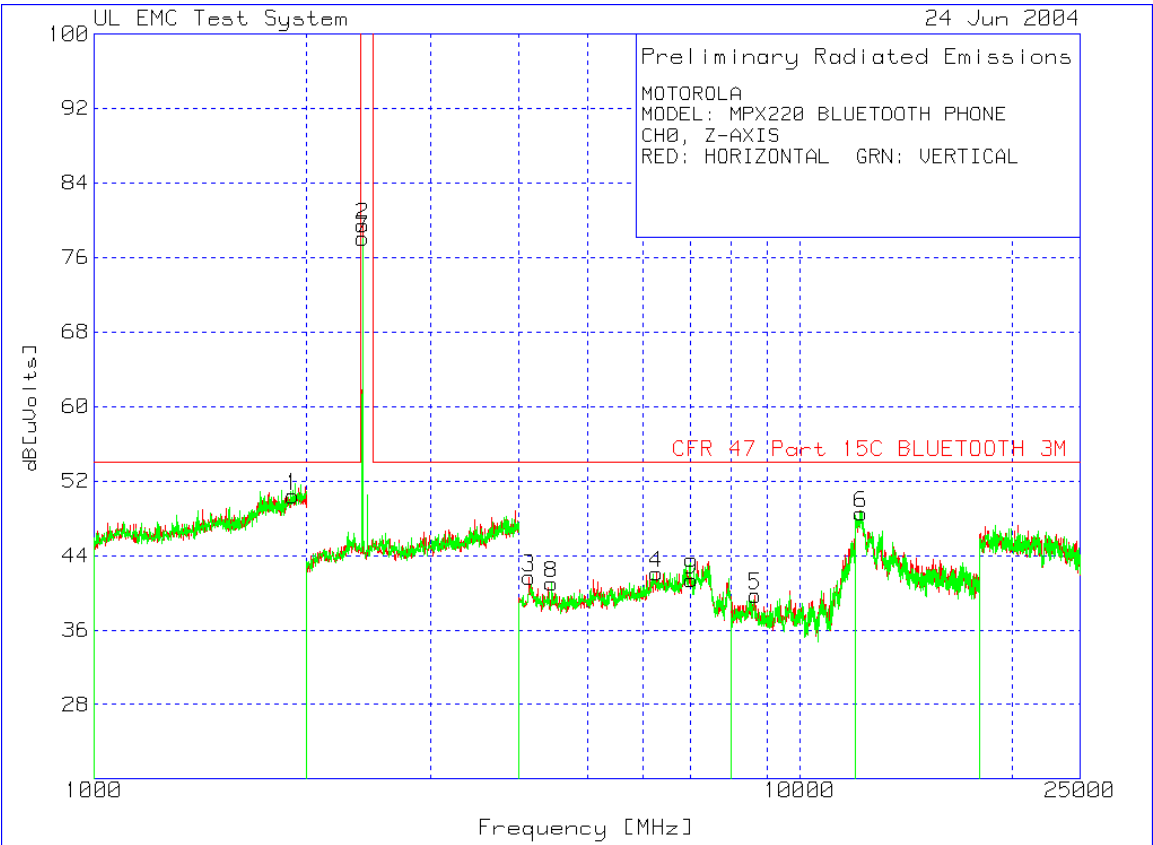
1-25GHz Low Channel X-Orientation

MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH0, X-AXIS 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
1 - 2GHz 1000 - 2000MHz									
1	1965.932	20.85 pk		3.1	28.1	52.05	54	-1.95	150 Horz
2 - 4GHz 2000 - 4000MHz									
2	2400.802	55.15 pk		3.3	21.8	80.25	999	-918.75	100 Horz
12 - 18GHz 12000 - 18000MHz									
5	12306.306	51.7 pk		-41.5	39.4	49.6	54	-4.4	100 Horz
2 - 4GHz 2000 - 4000MHz									
3	2400.802	58.26 pk		3.3	21.8	83.36	999	-915.64	100 Vert
4	3767.535	19.61 pk		4.1	23.9	47.61	54	-6.39	149 Vert
12 - 18GHz 12000 - 18000MHz									
6	12192.192	50.6 pk		-41.4	39.4	48.6	54	-5.4	149 Vert
LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M									



1-25GHz Low Channel Y-Orientation

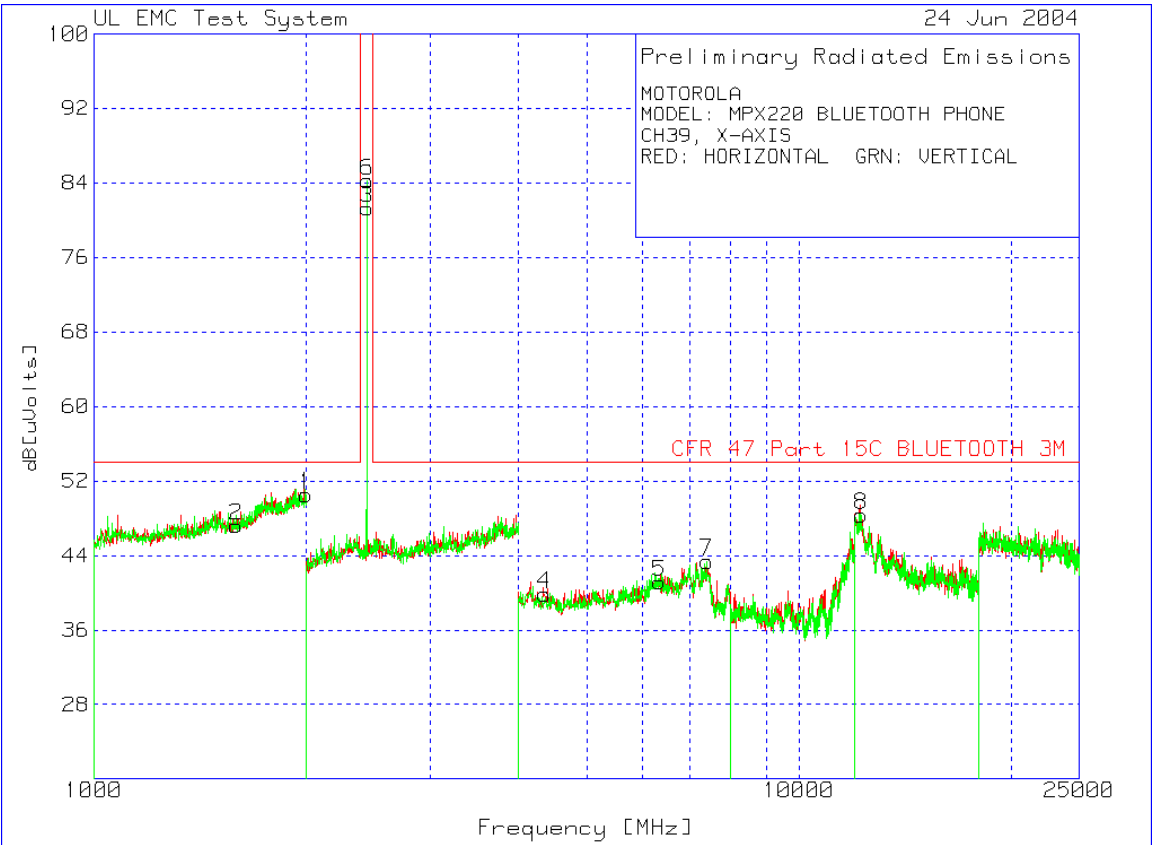
MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH0, Y-AXIS RED: HORIZONTAL GRN: VERTICAL									
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm] Polarity
1 - 2GHz 1000 - 2000MHz									
1	1889.78	20.65 pk		3	27.9	51.55	54	-2.45	149 Horz
2 - 4GHz 2000 - 4000MHz									
2	2400.802	55.81 pk		3.3	21.8	80.91	999	-918.09	100 Horz
4 - 8GHz 4000 - 8000MHz									
3	4816.817	63.66 pk		-51.4	27.7	39.96	54	-14.04	150 Horz
4	7375.375	58.88 pk		-47.3	31	42.58	54	-11.42	100 Horz
2 - 4GHz 2000 - 4000MHz									
5	2400.802	62.21 pk		3.3	21.8	87.31	999	-911.69	100 Vert
4 - 8GHz 4000 - 8000MHz									
6	4852.853	63.58 pk		-51.3	27.7	39.98	54	-14.02	150 Vert
7	7367.367	58.77 pk		-47.3	31	42.47	54	-11.53	100 Vert
12 - 18GHz 12000 - 18000MHz									
8	12000	51.86 pk		-41.2	39.4	50.06	54	-3.94	149 Vert
LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M									



1-25GHz Low Channel Z-Orientation

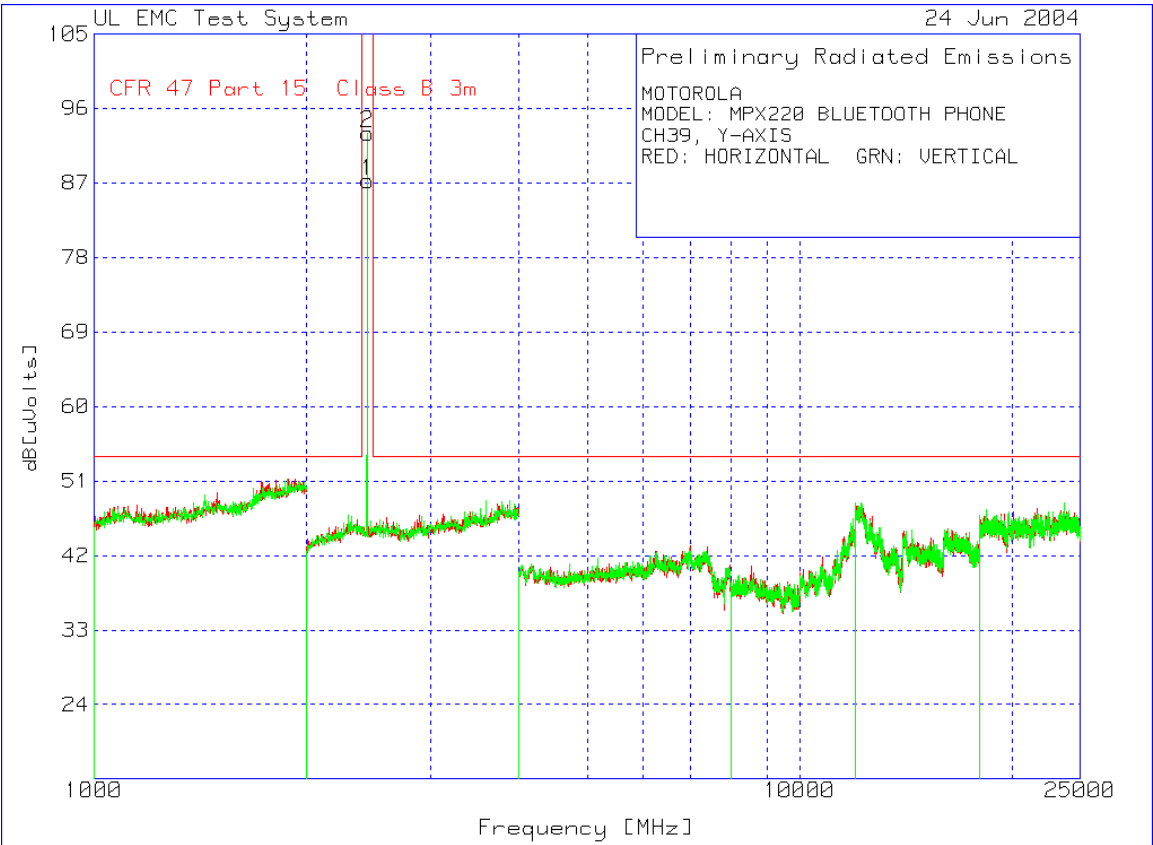
MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH0, Z-AXIS RED: HORIZONTAL GRN: VERTICAL									
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm] Polarity
1 - 2GHz 1000 - 2000MHz									
1	1911.824	19.5	pk	3	27.9	50.4	54	-3.6	100 Horz
2 - 4GHz 2000 - 4000MHz									
2	2400.802	54.38	pk	3.3	21.8	79.48	999	-919.52	100 Horz
4 - 8GHz 4000 - 8000MHz									
3	4136.273	65.2	pk	-51.9	28.4	41.7	54	-12.3	100 Horz
4	6268.537	60.41	pk	-47.5	29.2	42.11	54	-11.89	100 Horz
8 - 12GHz 8000 - 12000MHz									
5	8657.315	54.04	pk	-50.7	36.4	39.74	54	-14.26	100 Horz
12 - 18GHz 12000 - 18000MHz									
6	12228.457	50.01	pk	-40.9	39.4	48.51	54	-5.49	100 Horz
2 - 4GHz 2000 - 4000MHz									
7	2400.802	53	pk	3.3	21.8	78.1	999	-920.9	100 Vert
4 - 8GHz 4000 - 8000MHz									
8	4456.914	65.63	pk	-52.5	27.9	41.03	54	-12.97	100 Vert
9	7022.044	58.38	pk	-46.3	29.3	41.38	54	-12.62	100 Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M



1-25GHz Mid-Channel X-Orientation

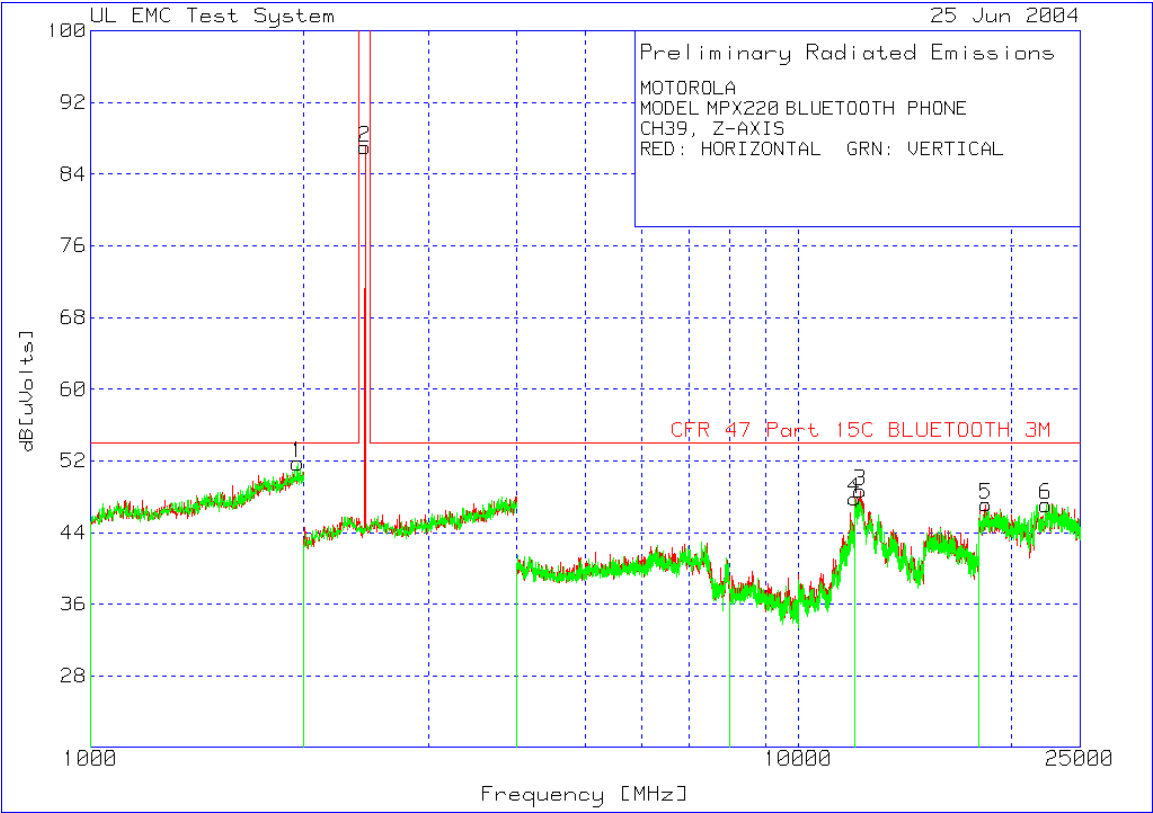
MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH39, X-AXIS RED: HORIZONTAL GRN: VERTICAL										
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1997.996	19.23	pk	3.1	28.2	50.53	54	-3.47	100	Horz
2	1589.178	17.59	pk	2.6	27	47.19	54	-6.81	100	Horz
2 - 4GHz 2000 - 4000MHz										
3	2440.882	56.07	pk	3.3	21.9	81.27	999	-917.73	100	Horz
4 - 8GHz 4000 - 8000MHz										
4	4360.721	64.58	pk	-52.8	28.1	39.88	54	-14.12	100	Horz
5	6340.681	59.56	pk	-47.6	29.2	41.16	54	-12.84	100	Horz
2 - 4GHz 2000 - 4000MHz										
6	2440.882	59.05	pk	3.3	21.9	84.25	999	-914.75	100	Vert
4 - 8GHz 4000 - 8000MHz										
7	7406.814	59.37	pk	-47.1	31.1	43.37	54	-10.63	100	Vert
12 - 18GHz 12000 - 18000MHz										
8	12252.505	49.65	pk	-40.7	39.4	48.35	54	-5.65	100	Vert
LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M										



1-25GHz Mid-Channel Y-Orientation

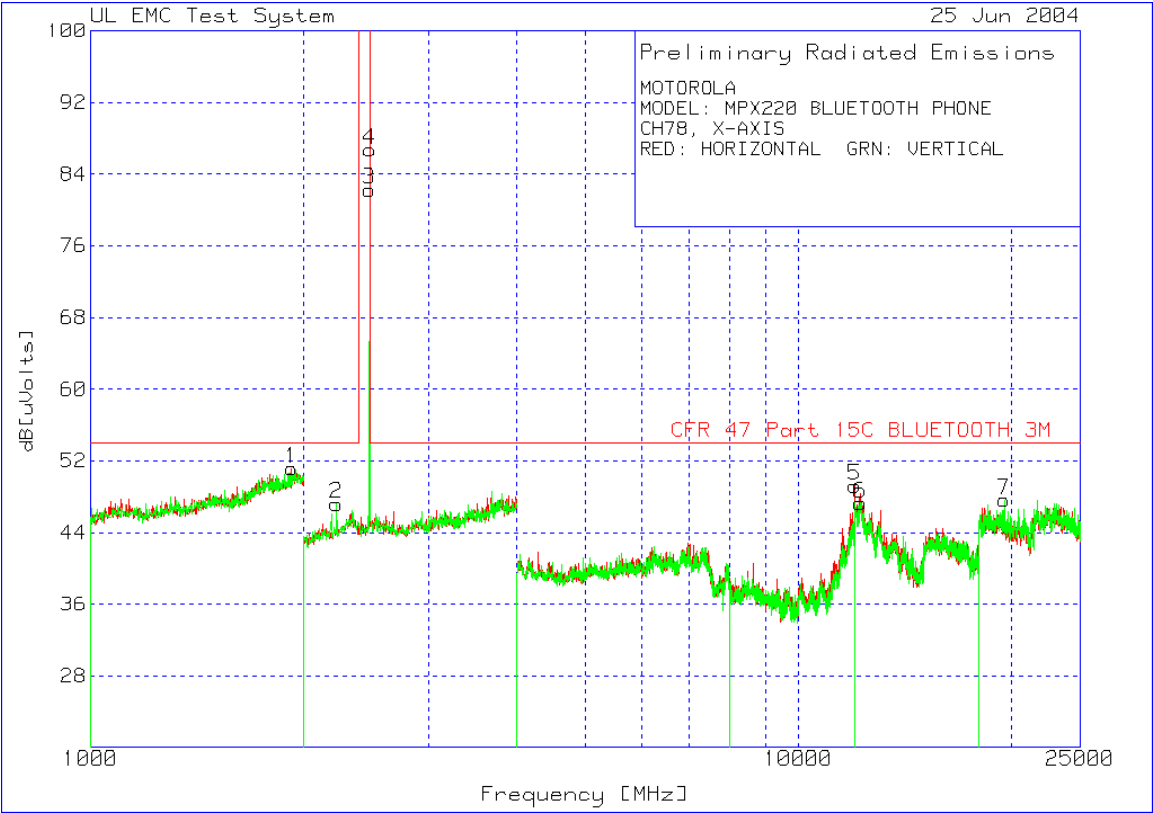
MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH39, Y-AXIS RED: HORIZONTAL GRN: VERTICAL									
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm] Polarity
2 - 4GHz 2000 - 4000MHz									
1	2440.882	62.07	pk	3.3	21.9	87.27	999	-911.73	100 Horz
2 - 4GHz 2000 - 4000MHz									
2	2440.882	67.82	pk	3.3	21.9	93.02	999	-905.98	100 Vert

LIMIT 1: CFR 47 Part 15 Class B 3m



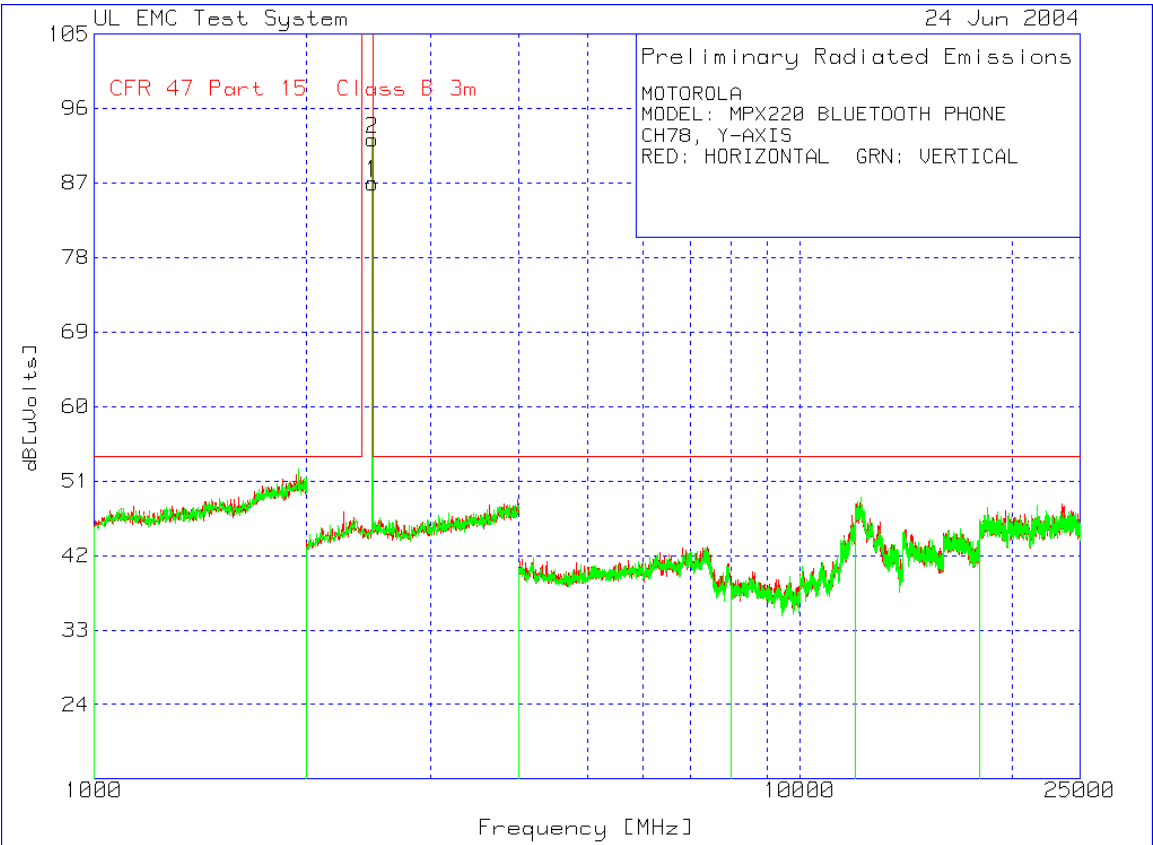
1-25GHz Mid-Channel Z-Orientation

MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH39, Z-AXIS 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 2000 - 4000MHz									
2	2440.882	61.83 pk		3.3	21.9	87.03	999	-911.97	100 Horz
12 - 18GHz 12000 - 18000MHz									
3	12210.21	50.44 pk		-41.2	39.4	48.64	54	-5.36	150 Horz
18-26.5GHz 18000 - 25000MHz									
5	18385.385	73.73 pk		-66.7	40.1	47.13	54	-6.87	100 Horz
1 - 2GHz 1000 - 2000MHz									
1	1959.92	20.56 pk		3.1	28.1	51.76	54	-2.24	150 Vert
12 - 18GHz 12000 - 18000MHz									
4	12000	49.58 pk		-41.2	39.4	47.78	54	-6.22	150 Vert
18-26.5GHz 18000 - 25000MHz									
6	22351.351	65.7 pk		-59.1	40.5	47.1	54	-6.9	100 Vert
LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M									



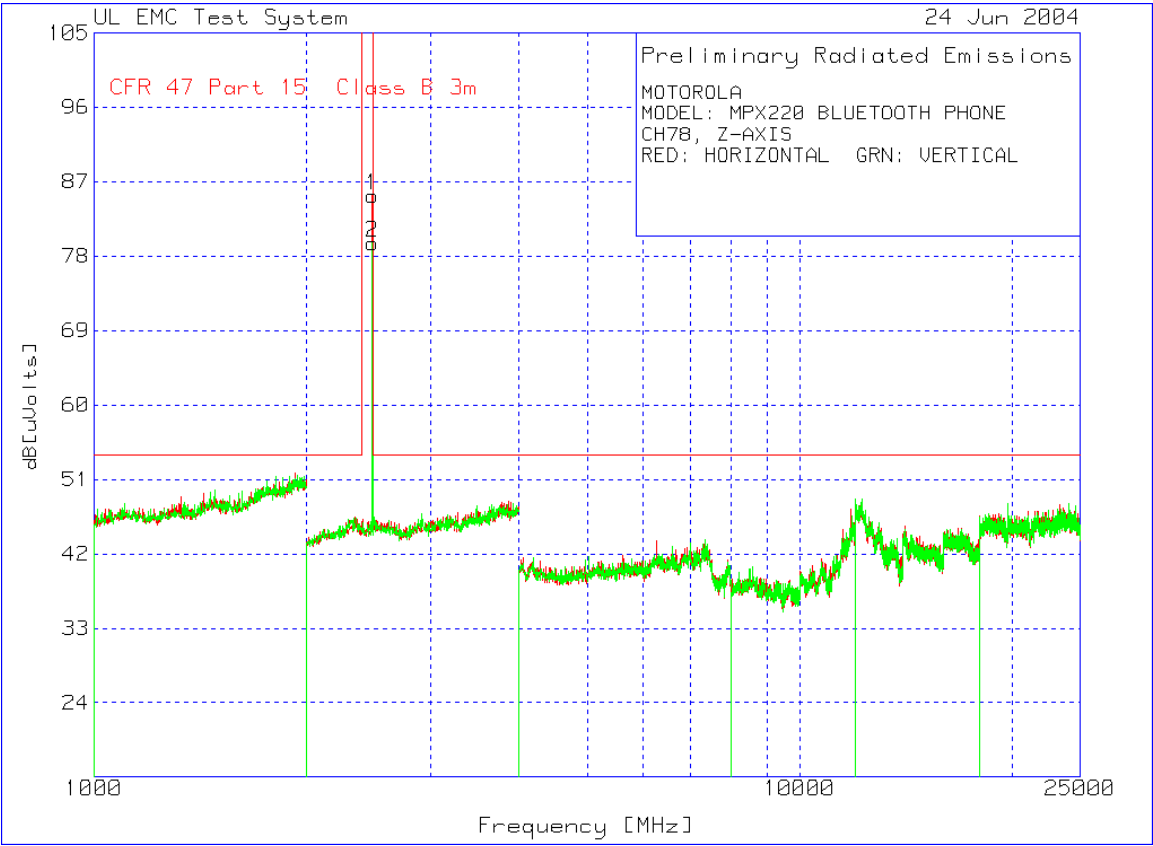
MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH78, X-AXIS RED: HORIZONTAL GRN: VERTICAL										
Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1921.844	20.17 pk		3	28	51.17	54	-2.83	100	Horz
2 - 4GHz 2000 - 4000MHz										
3	2476.954	57 pk		3.3	22	82.3	999	-916.7	100	Horz
12 - 18GHz 12000 - 18000MHz										
5	12000	51.01 pk		-41.2	39.4	49.21	54	-4.79	149	Horz
2 - 4GHz 2000 - 4000MHz										
2	2224.449	22.2 pk		3.2	21.8	47.2	54	-6.8	100	Vert
4	2480.962	61.43 pk		3.3	22	86.73	999	-912.27	100	Vert
12 - 18GHz 12000 - 18000MHz										
6	12210.21	49.11 pk		-41.2	39.4	47.31	54	-6.69	150	Vert
18-26.5GHz 18000 - 25000MHz										
7	19520.521	75.95 pk		-68.6	40.3	47.65	54	-6.35	100	Vert

LIMIT 1: CFR 47 Part 15C BLUETOOTH 3M



1-25GHz High-Channel Y-Orientation

MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH78, Y-AXIS 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 2000 - 4000MHz										
1	2480.962	61.73 pk		3.3	22	87.03	999	-911.97	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	66.97 pk		3.3	22	92.27	999	-906.73	100	Vert
LIMIT 1: CFR 47 Part 15 Class B 3m										



1-25GHz High-Channel Z-Orientation

MOTOROLA MODEL: MPX220 BLUETOOTH PHONE CH78, Z-AXIS 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 2000 - 4000MHz									
1	2480.962	60.02	pk	3.3	22	85.32	999	-913.68	100 Horz
2 - 4GHz 2000 - 4000MHz									
2	2480.962	54.29	pk	3.3	22	79.59	999	-919.41	100 Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

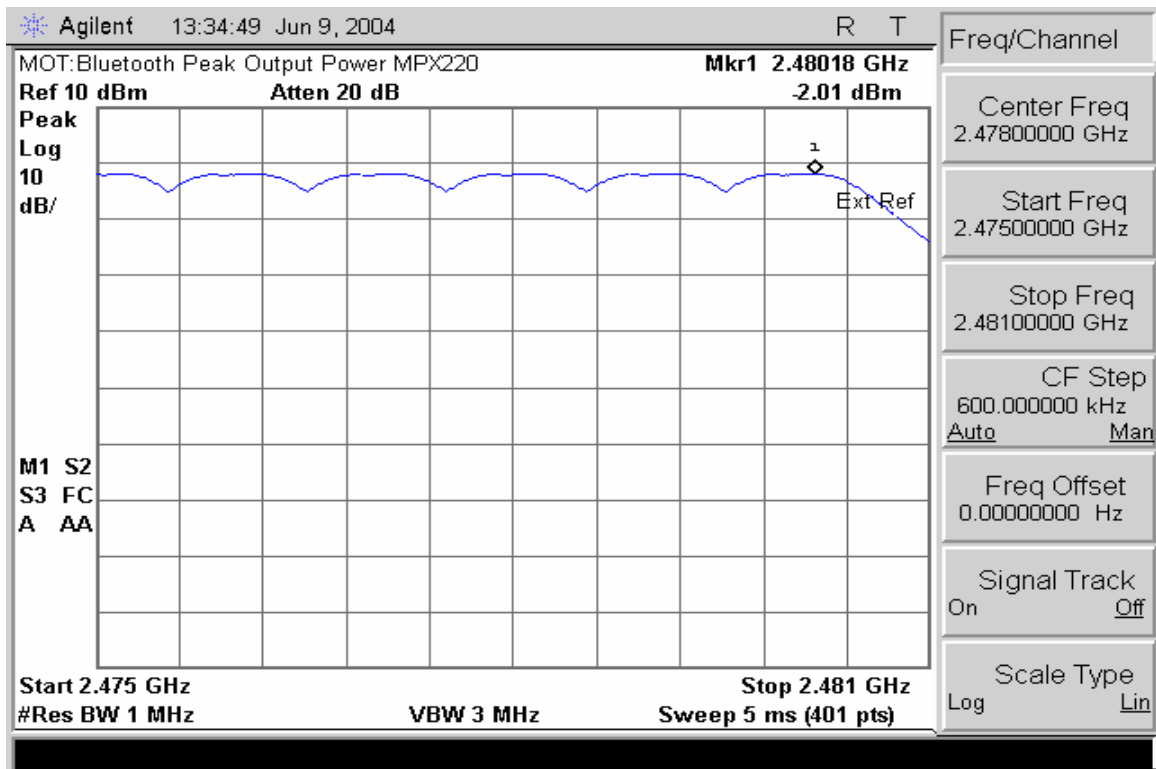
PEAK OUTPUT POWER

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

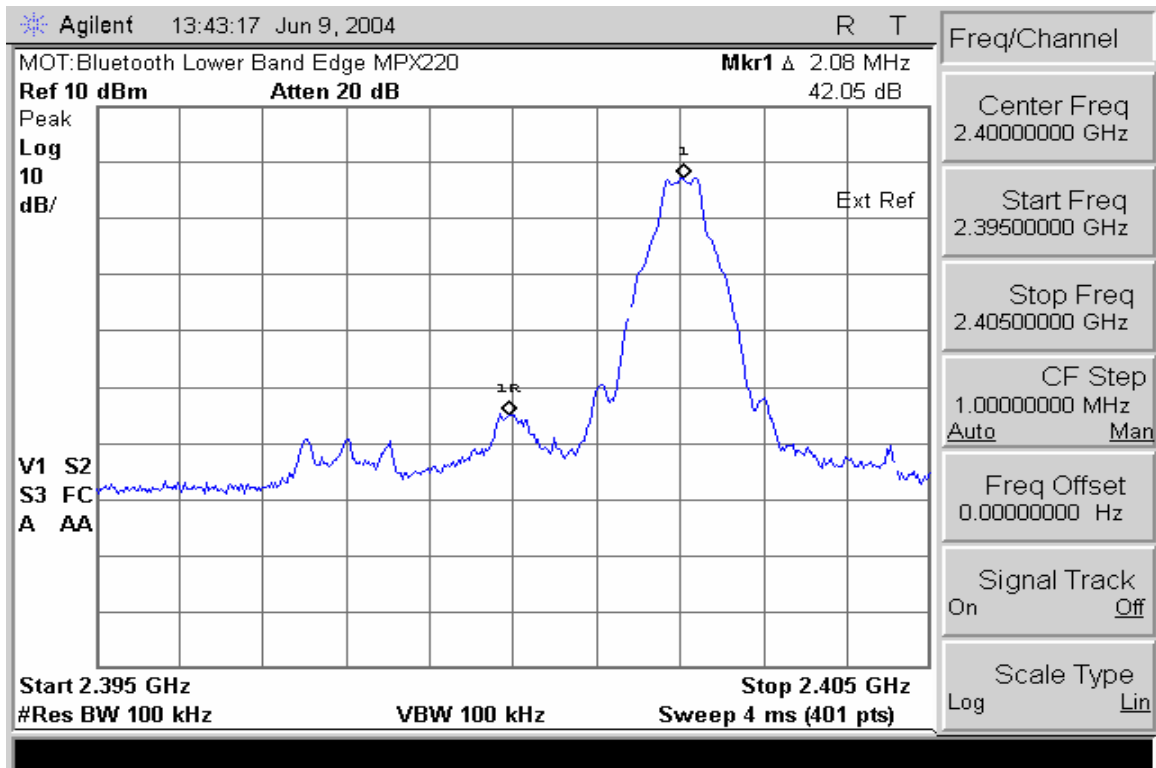
CFR 47 Part 15.247

Measurement Procedure

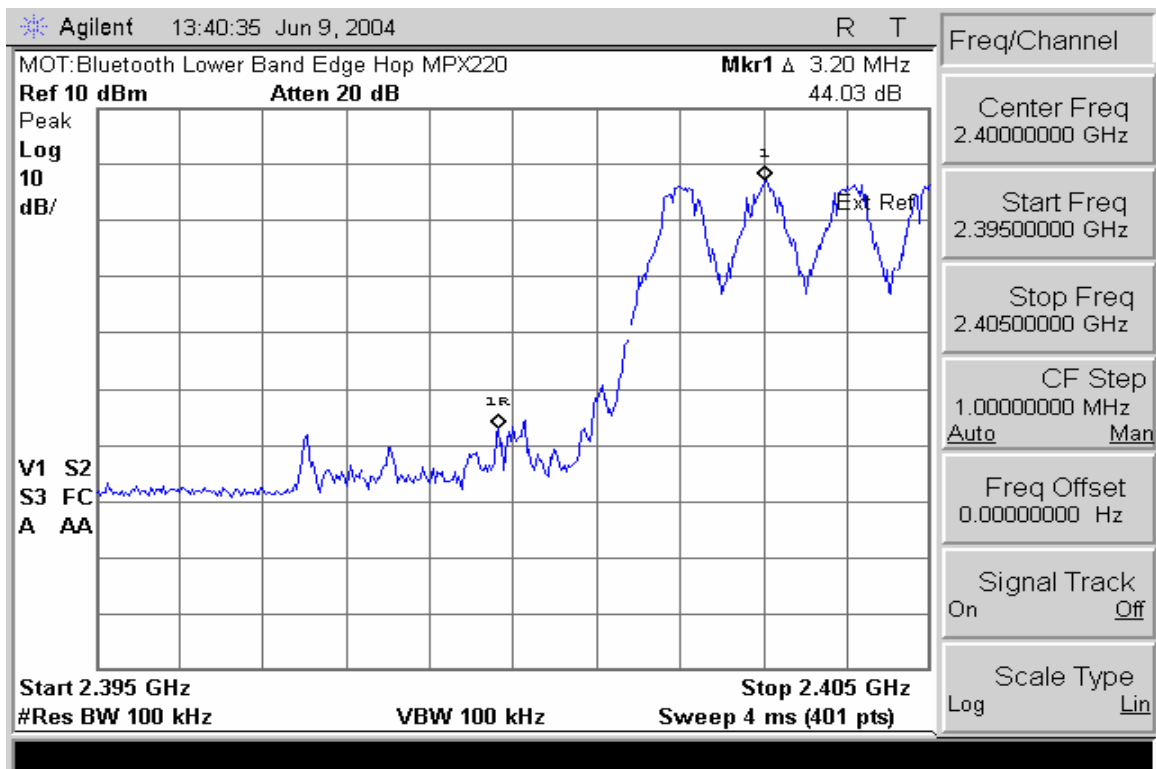
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

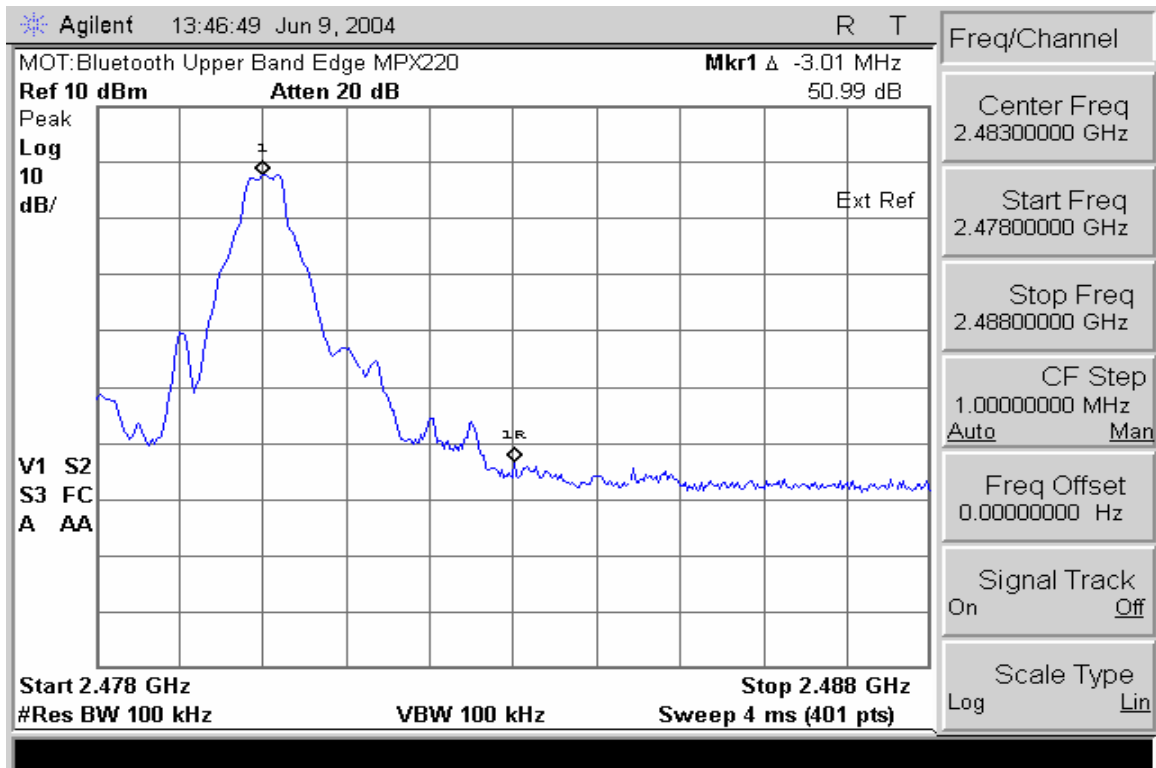
See Attached:



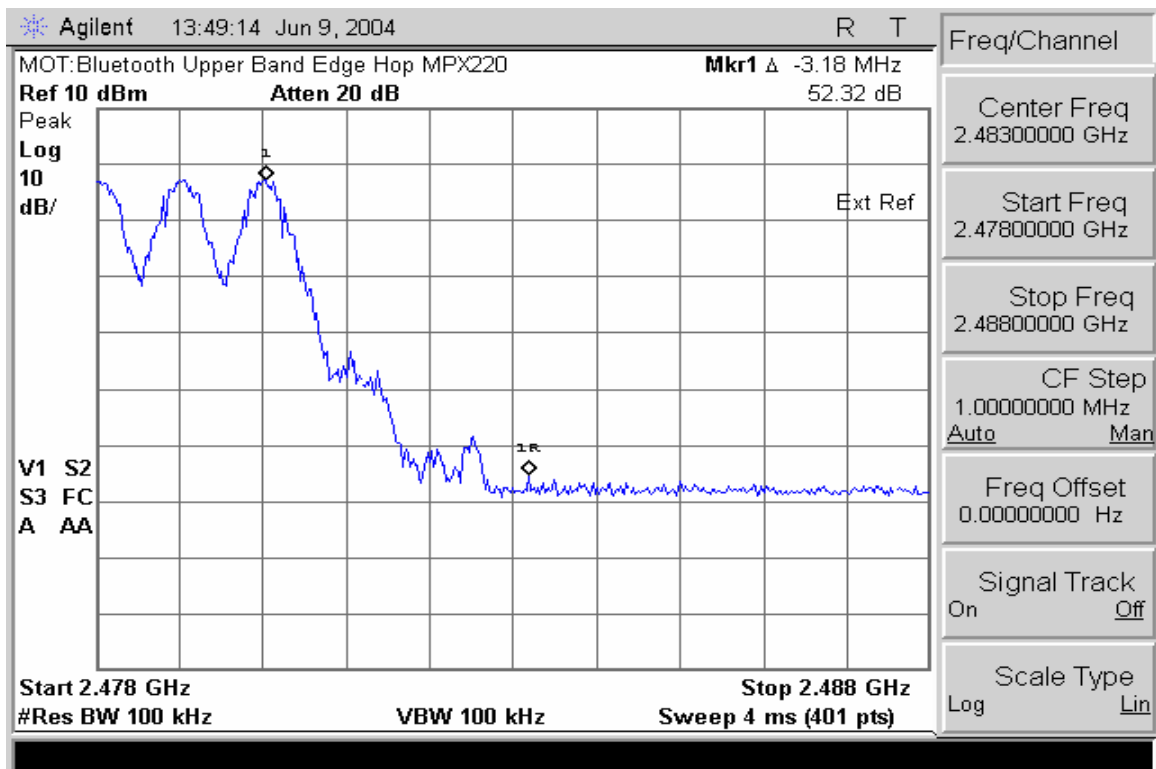
Low Band Edge with Hopping Disabled



Low Band Edge with Hopping Enabled



High Band Edge with Hopping Disabled



High Band Edge with Hopping Enabled

SPURIOUS RF CONDUCTED EMISSIONS

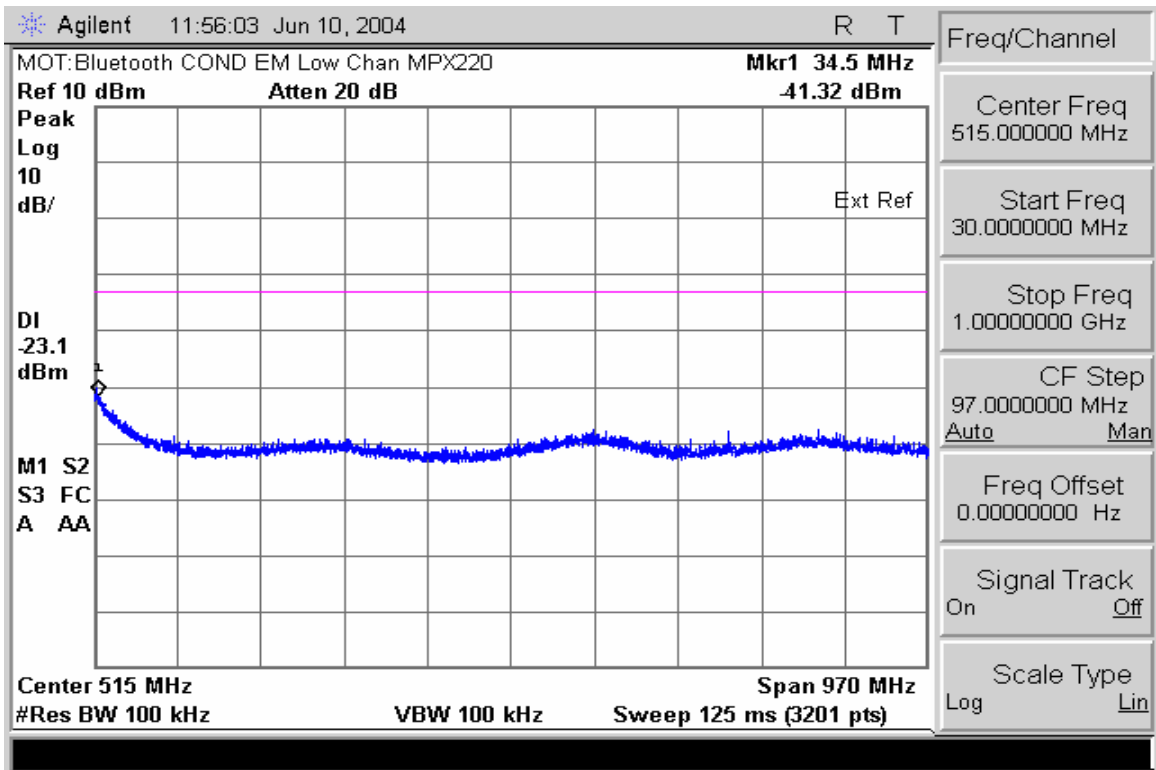
CFR 47 Part 15.247

Measurement Procedure

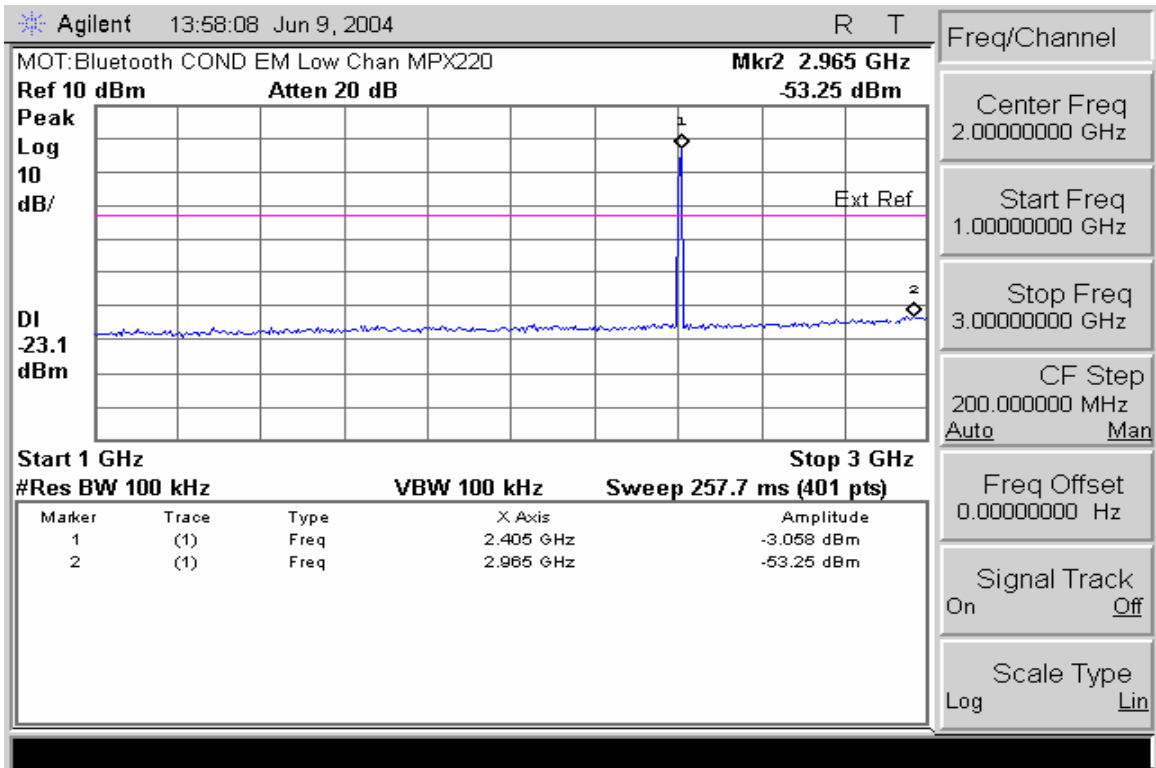
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

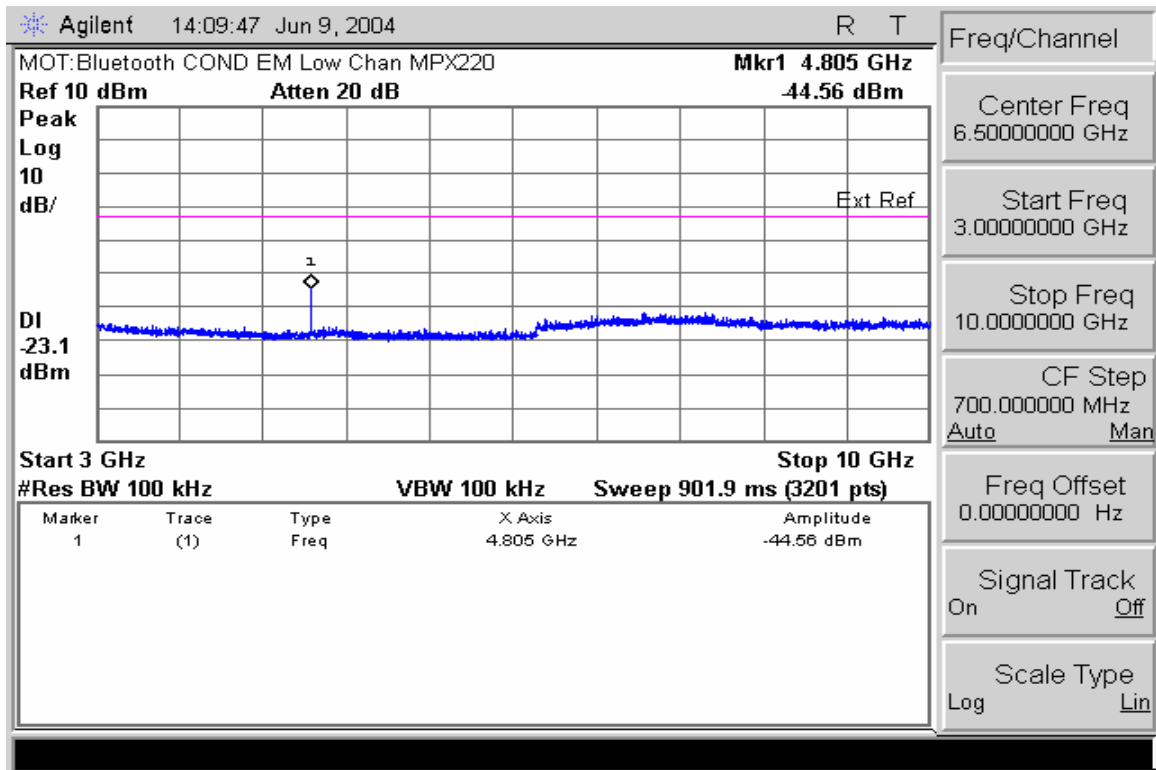
See attached:



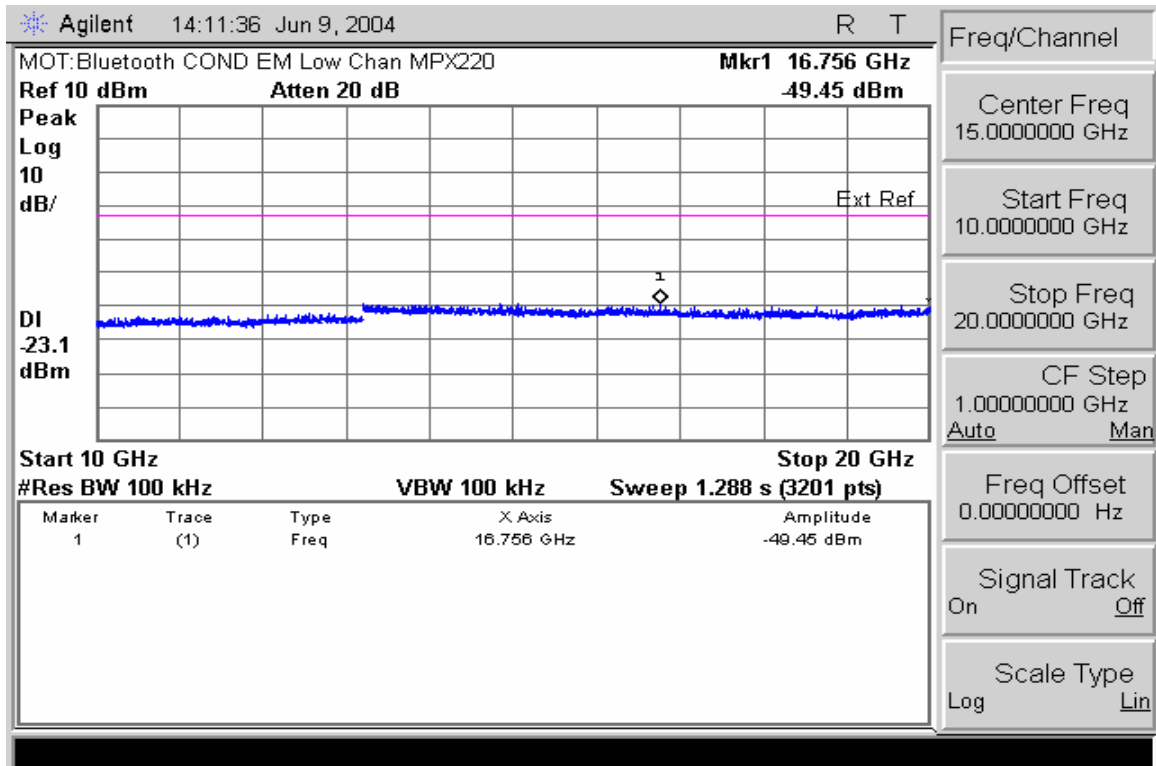
Conducted Spurious Emissions 30-1000 MHz (Low Channel Enabled)



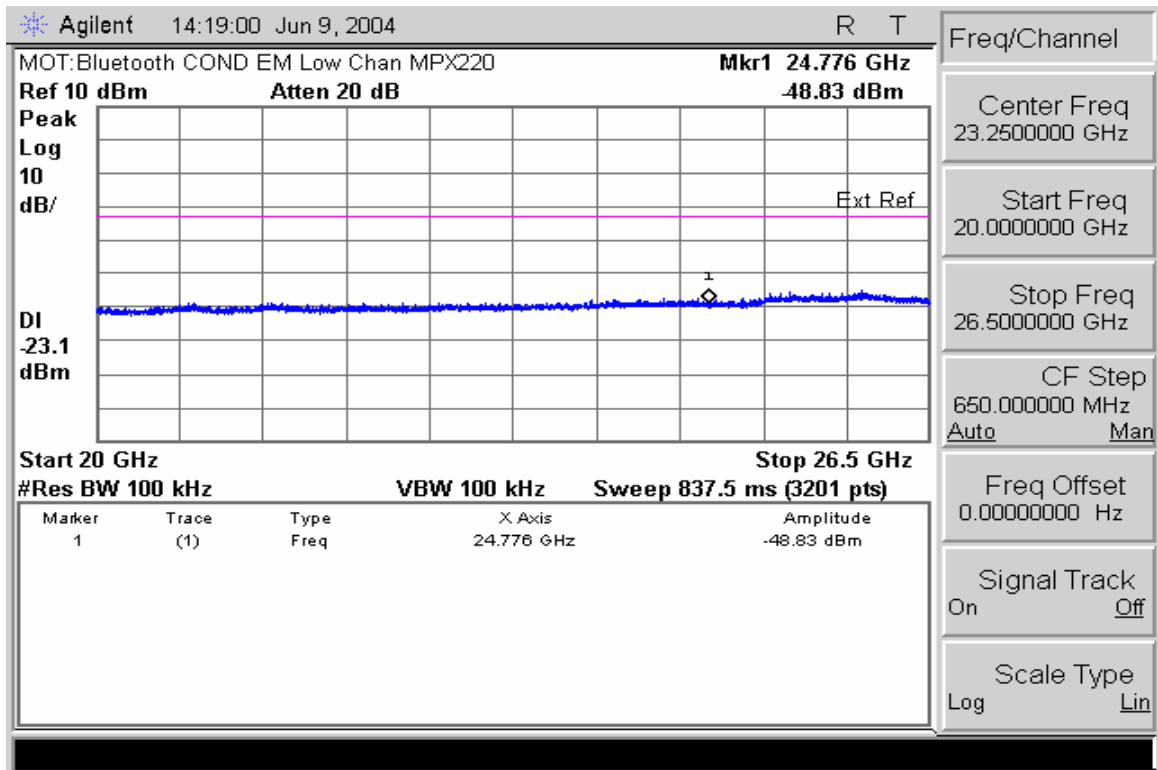
Conducted Spurious Emissions 1-3 GHz (Low Channel Enabled)



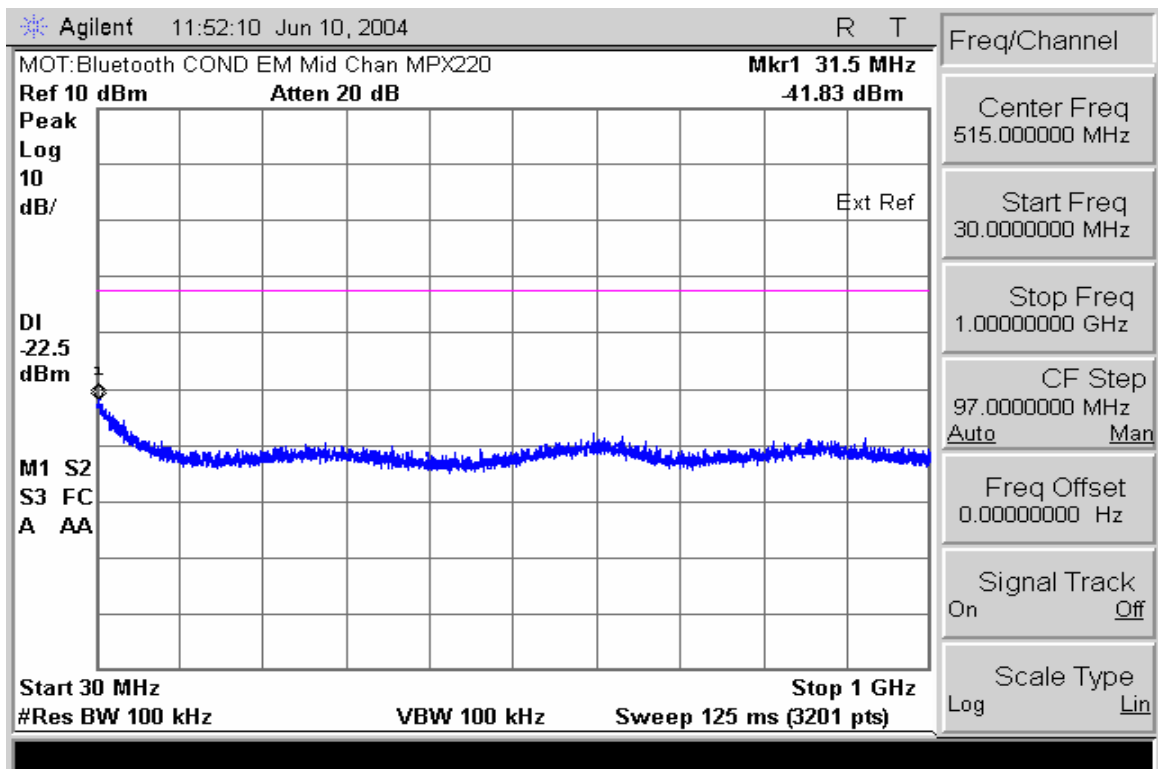
Conducted Spurious Emissions 3-10 GHz (Low Channel Enabled)



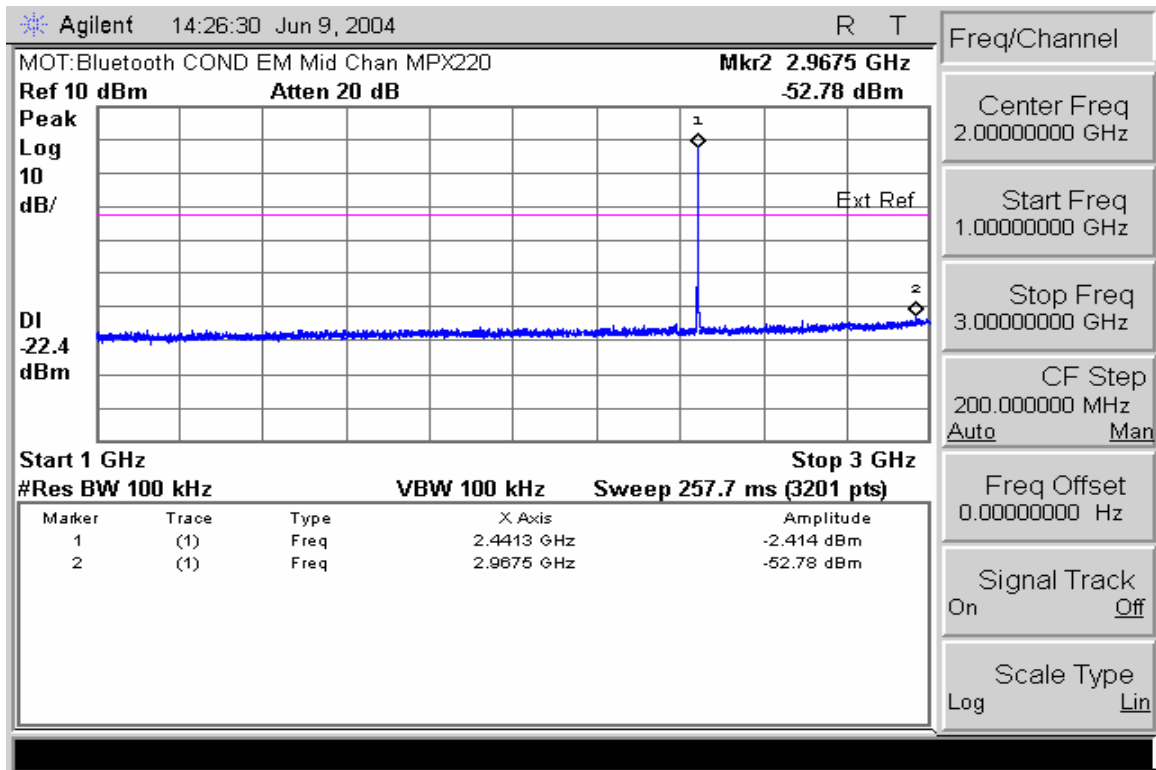
Conducted Spurious Emissions 10-20 GHz (Low Channel Enabled)



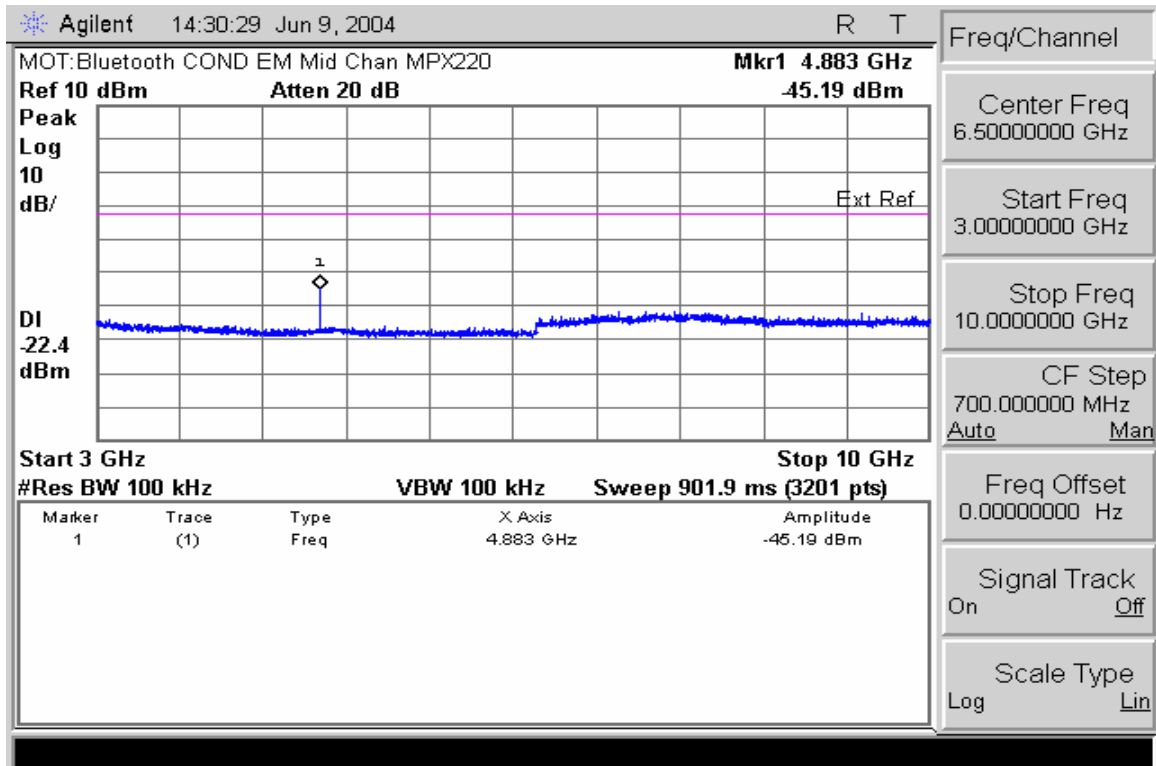
Conducted Spurious Emissions 20-26.5 GHz (Low Channel Enabled)



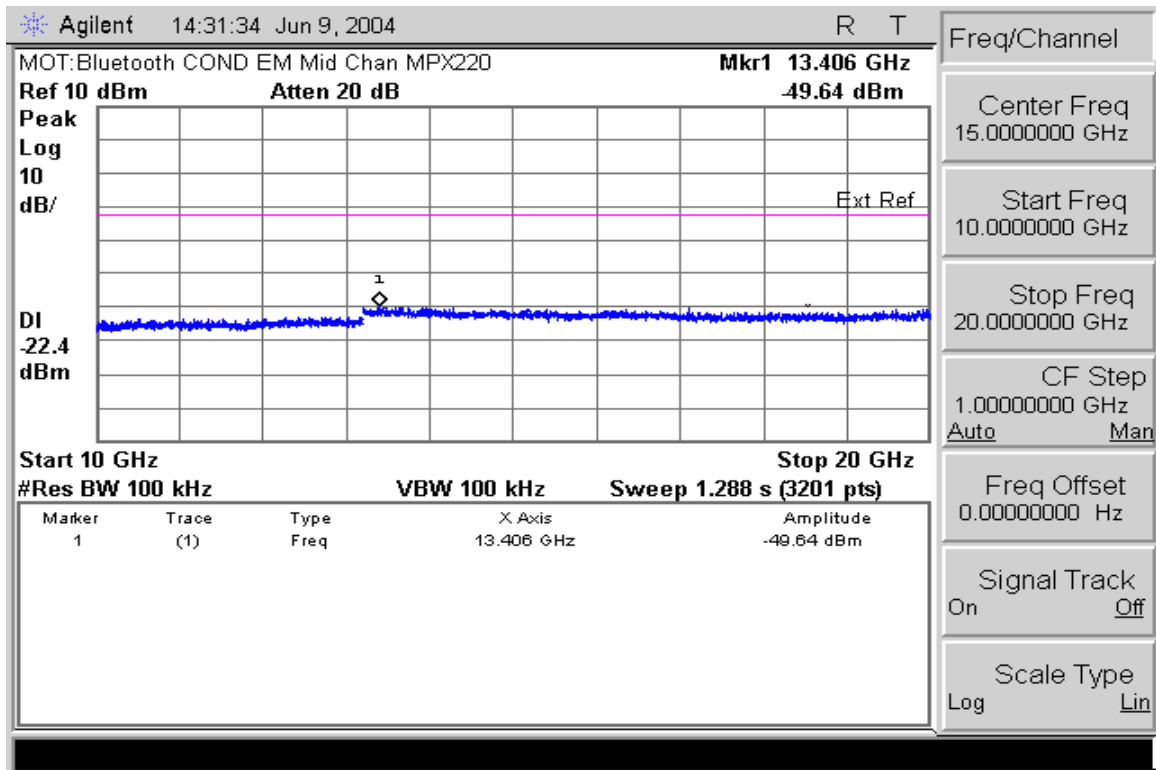
Conducted Spurious Emissions 30-1000 MHz (Mid Channel Enabled)



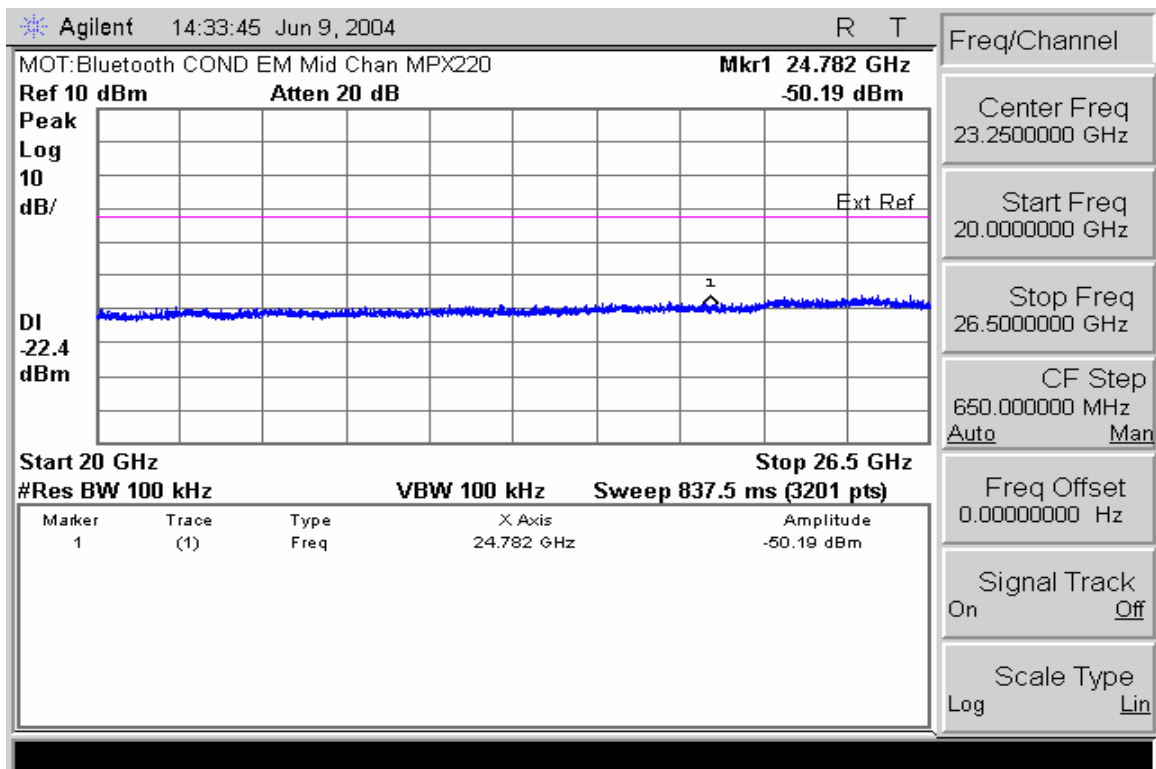
Conducted Spurious Emissions 1-3 GHz (Mid Channel Enabled)



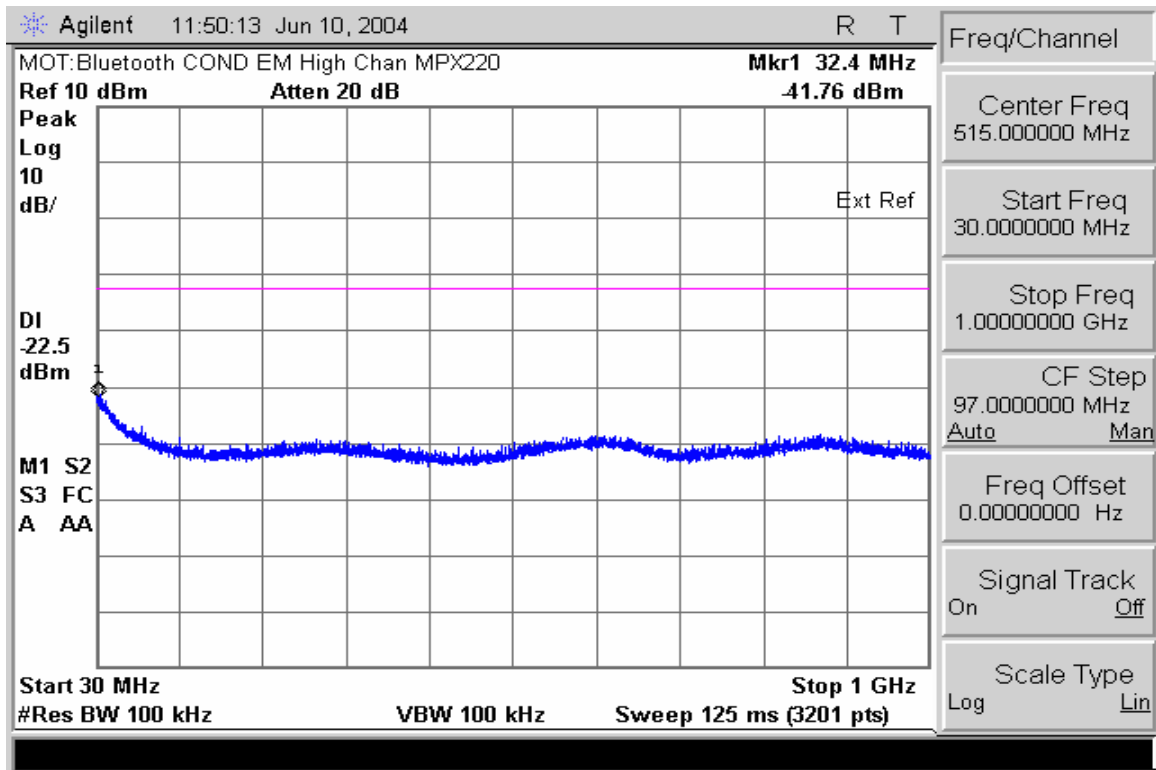
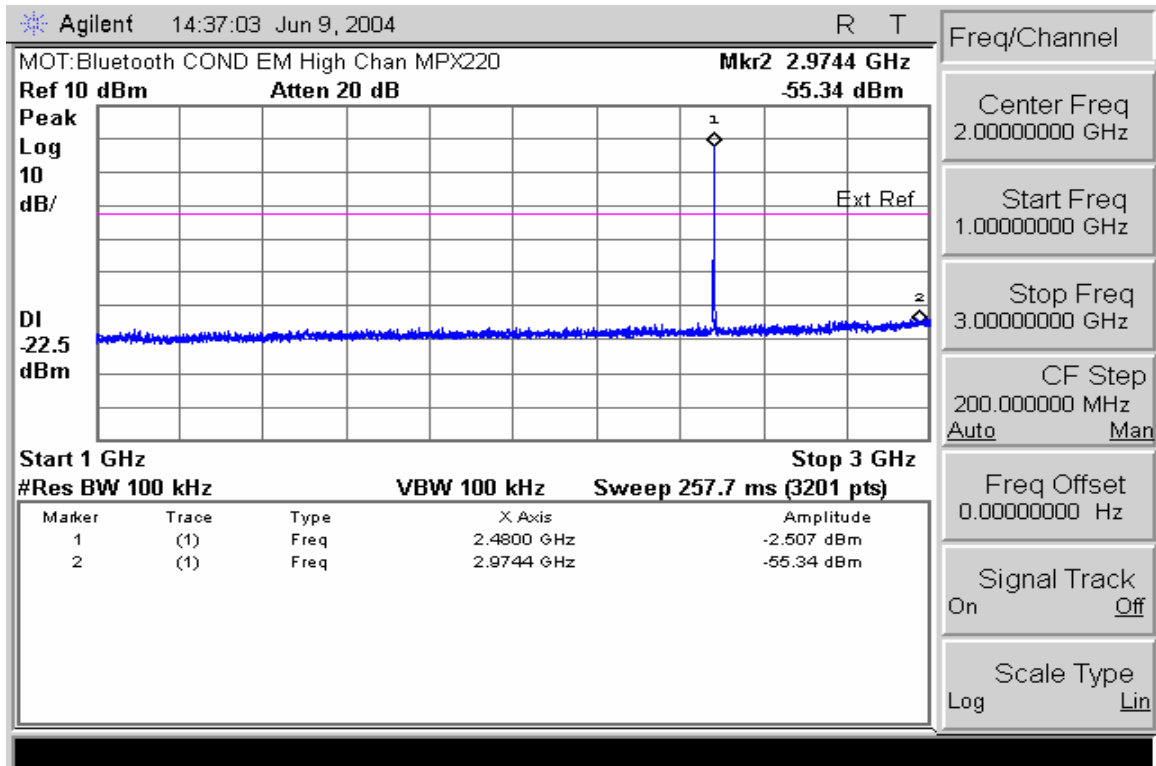
Conducted Spurious Emissions 3-10 GHz (Mid Channel Enabled)

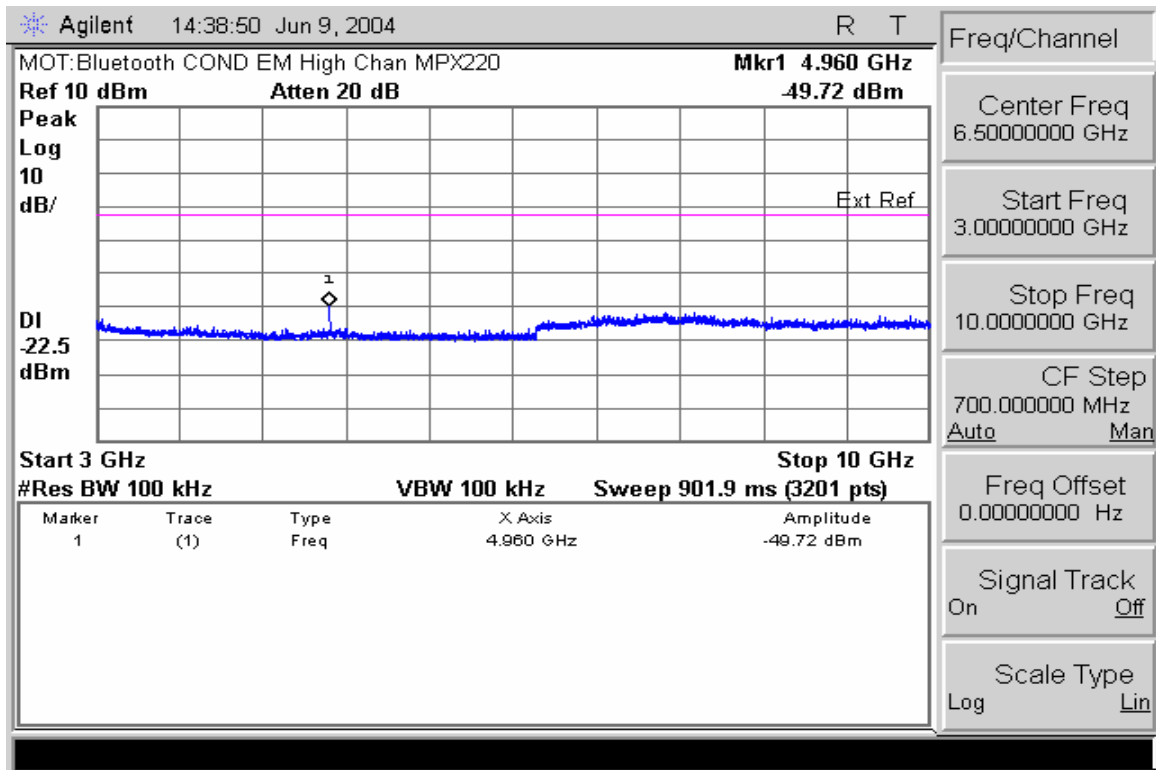


Conducted Spurious Emissions 10-20 GHz (Mid Channel Enabled)

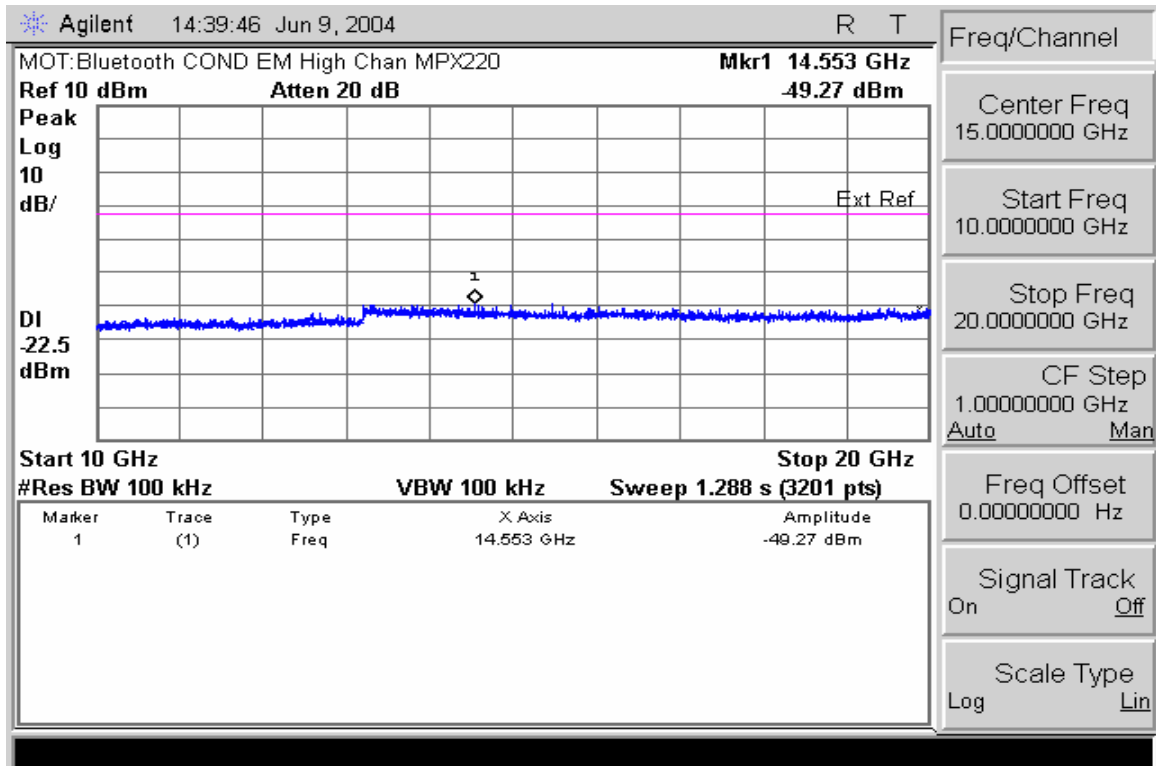


Conducted Spurious Emissions 20-26.5 GHz (Mid Chan Enabled)

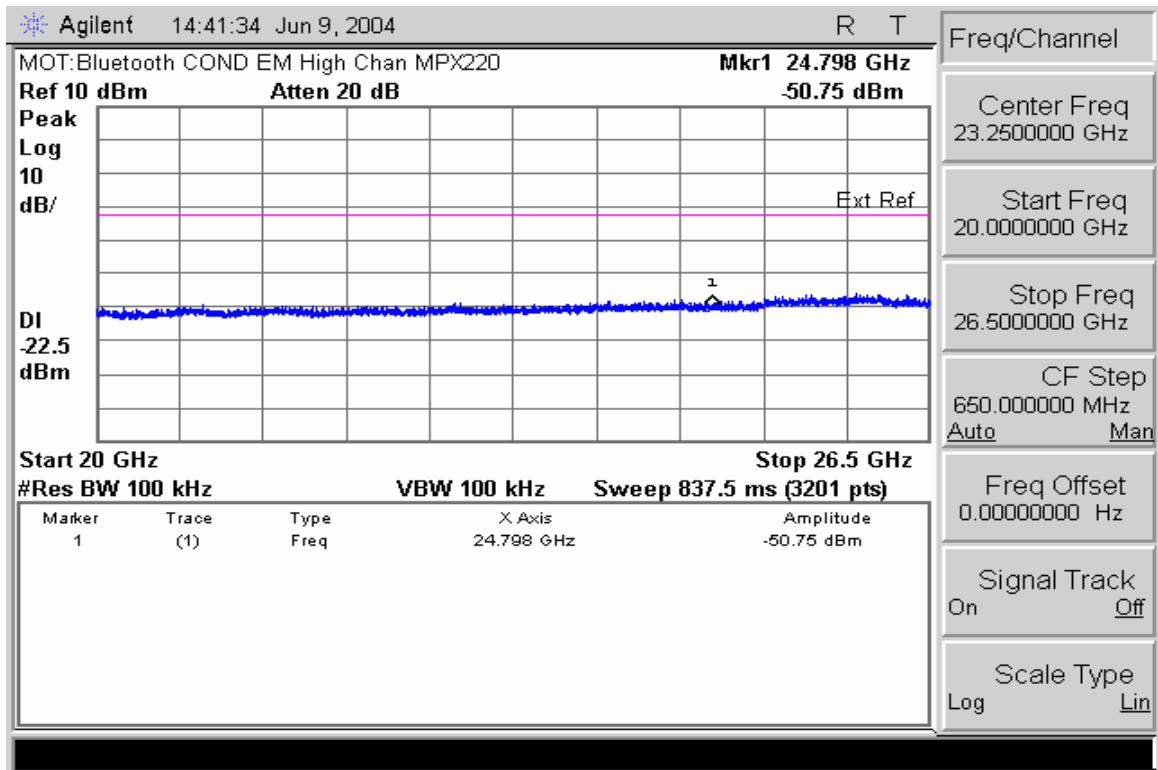
**Conducted Spurious Emissions 30-1000 MHz (High Channel Enabled)****Conducted Spurious Emissions 1-3 GHz (High Channel Enabled)**



Conducted Spurious Emissions 3-10 GHz (High Channel Enabled)



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



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

End of Test Report