



MOTOROLA

**PERSONAL COMMUNICATIONS SECTOR
PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY
EMC TEST REPORT - Addendum**

Test Report Number –14254 -1BT

Report Date: July 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.

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

Signature:

Name: Michael E. Hill

Title: Senior Electrical Engineer

Date: July 9, 2004

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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, Bluetooth

Model Number: E680

Serial Numbers: 00440000613098, 00440000613099,
00440000613100

Testing Complete Date: July 7, 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	999 kHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.915ms
4	20 dB Bandwidth	1.000 MHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	3.532 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	ES126	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 E398 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 E398 had its hopping function enabled. The following spectrum analyzer settings were used:

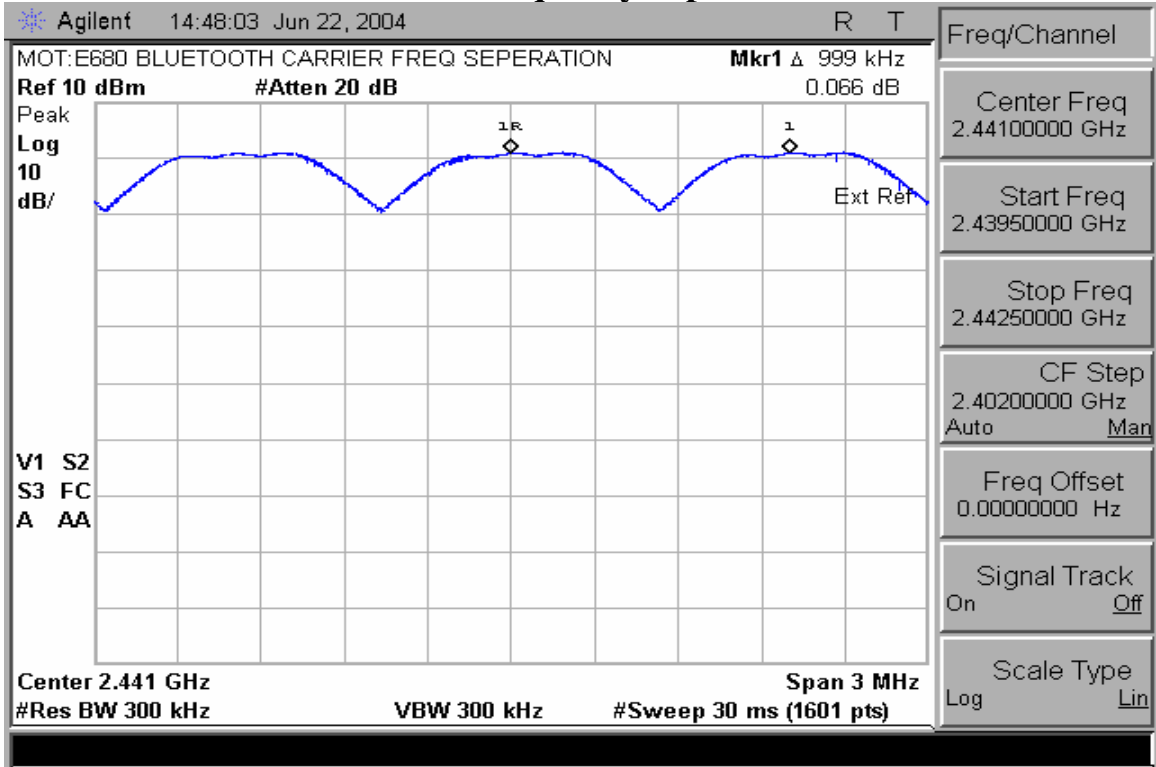
1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) \geq 1% of the span
3. Video (or Average) Bandwidth (VBW) \geq RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

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.

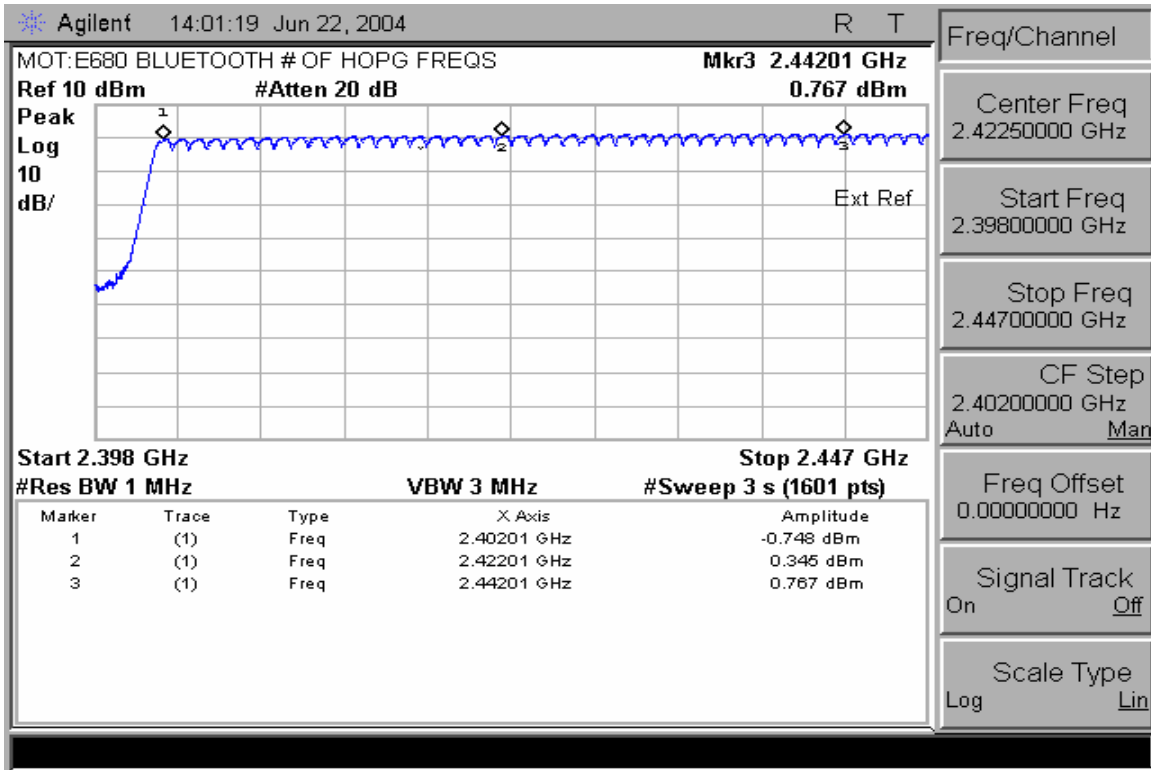
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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

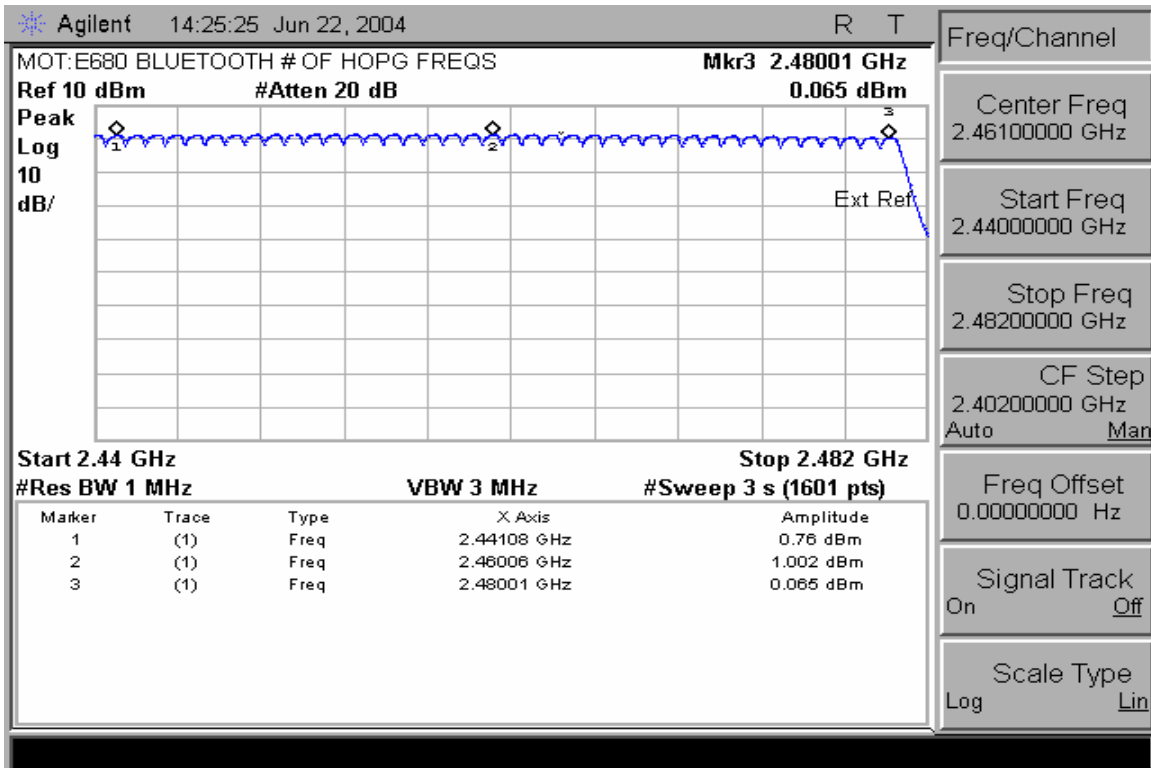
The trace was allowed to stabilize.

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.

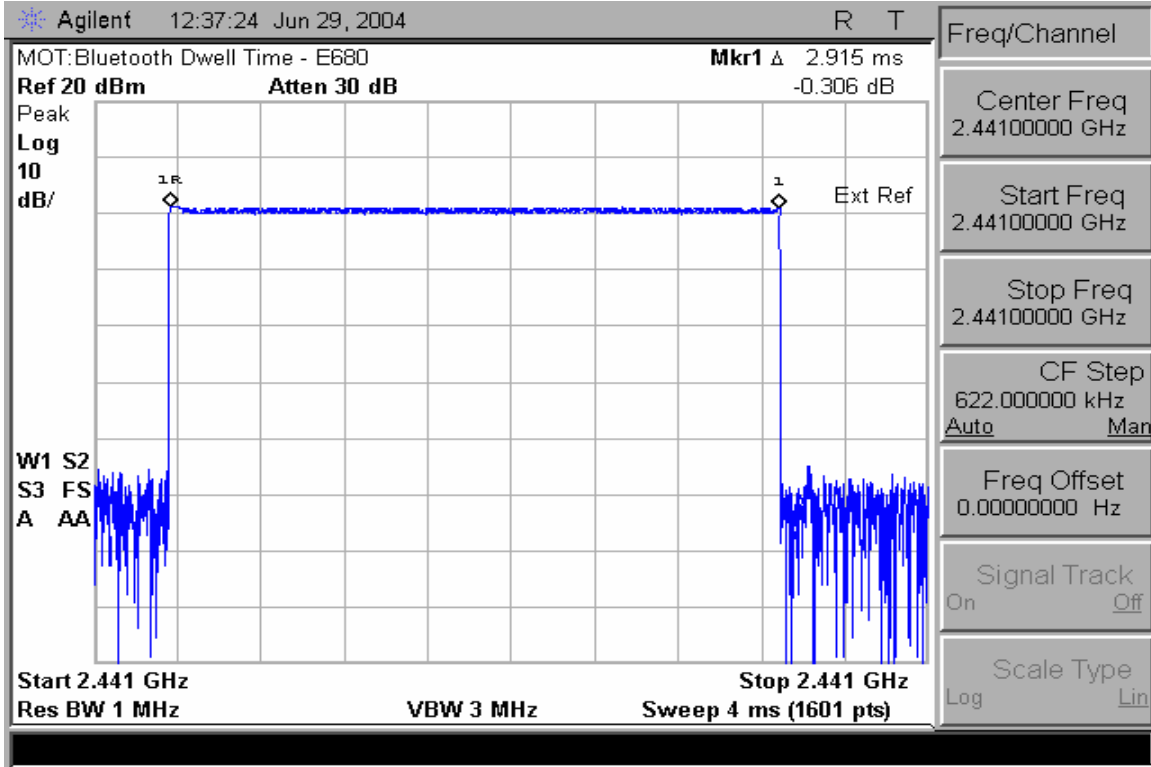
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

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.

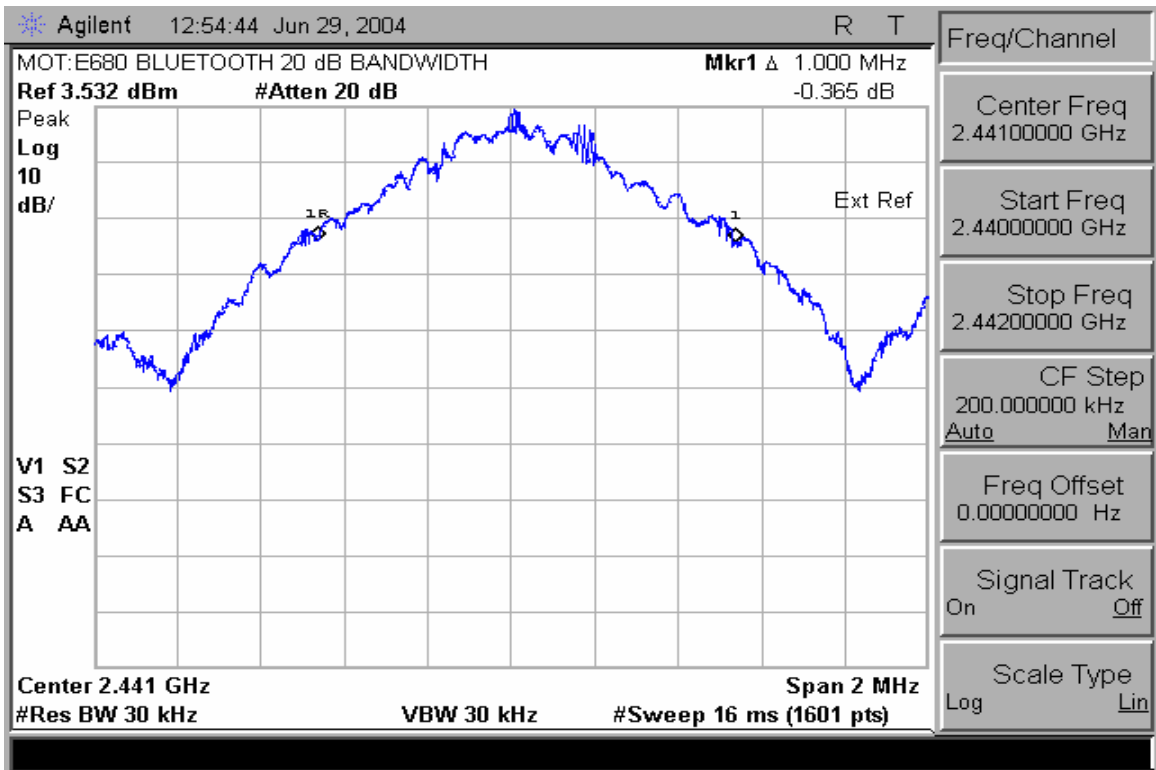
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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



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.

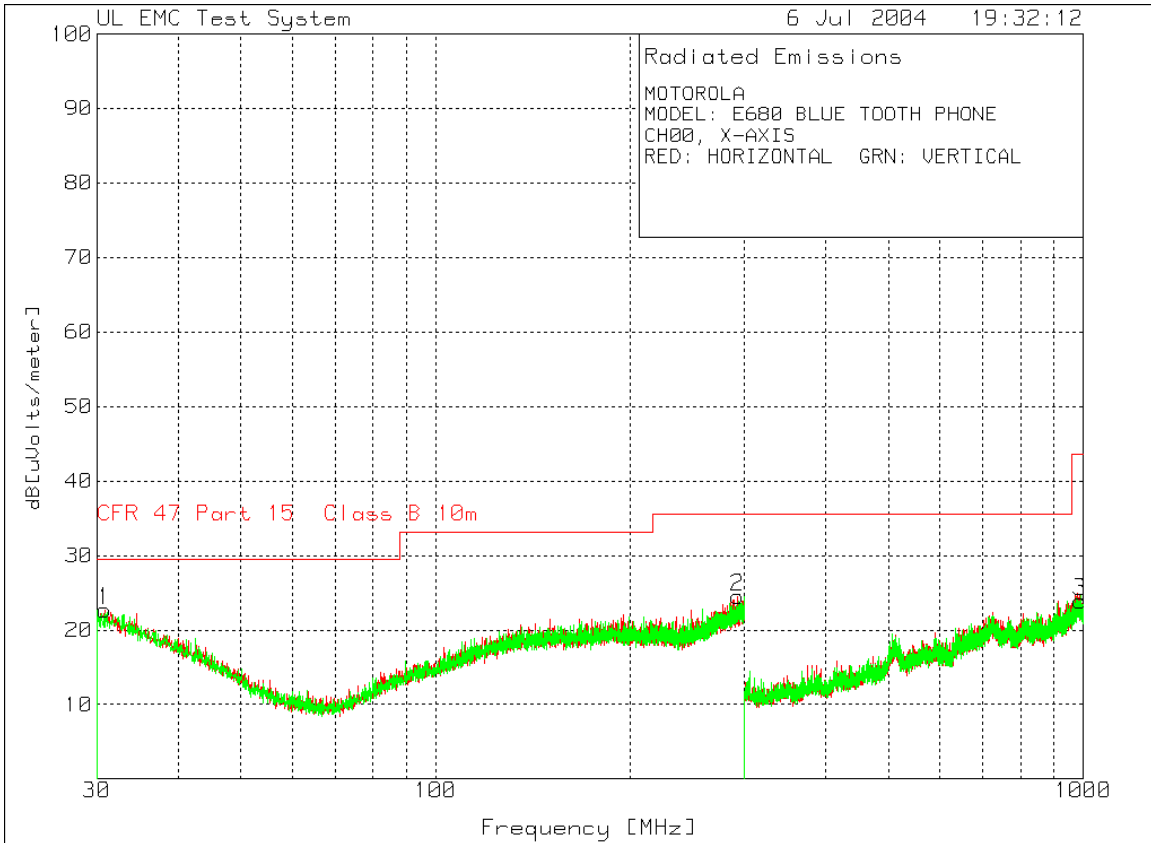
Field Strength (dBuV/m) = EMI Receiver Level (dBuV) + Cable Loss (dB) -
Amplifier Gain (dB) + Antenna Correction Factor (1/m)

A fully charged battery was used for the supply voltage.

This data was taken at Underwriter's Laboratories.

Measurement Results

Attached

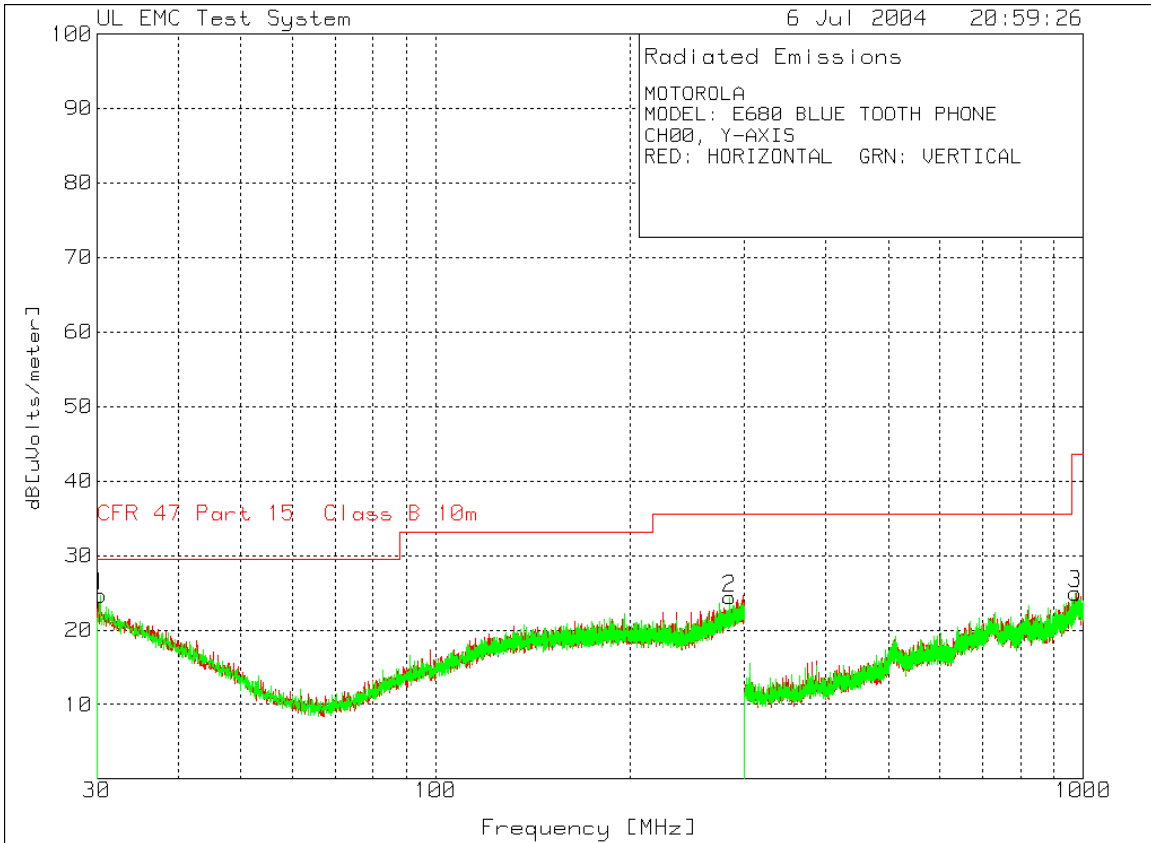


30 -1000MHz Low Channel Dual Polarization X-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH00 X-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1 dB[uVolts/meter]	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.8094	32	pk	-26.9	17.6	22.7	29.6	-6.9	304	100	Horz
2	292.579	31.8	pk	-25.6	18.3	24.5	35.6	-11.1	264	100	Horz
Range: 4 300 - 1000MHz											
3	989.1587	30.9	pk	-31.1	24.1	23.9	43.5	-19.6	241	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE

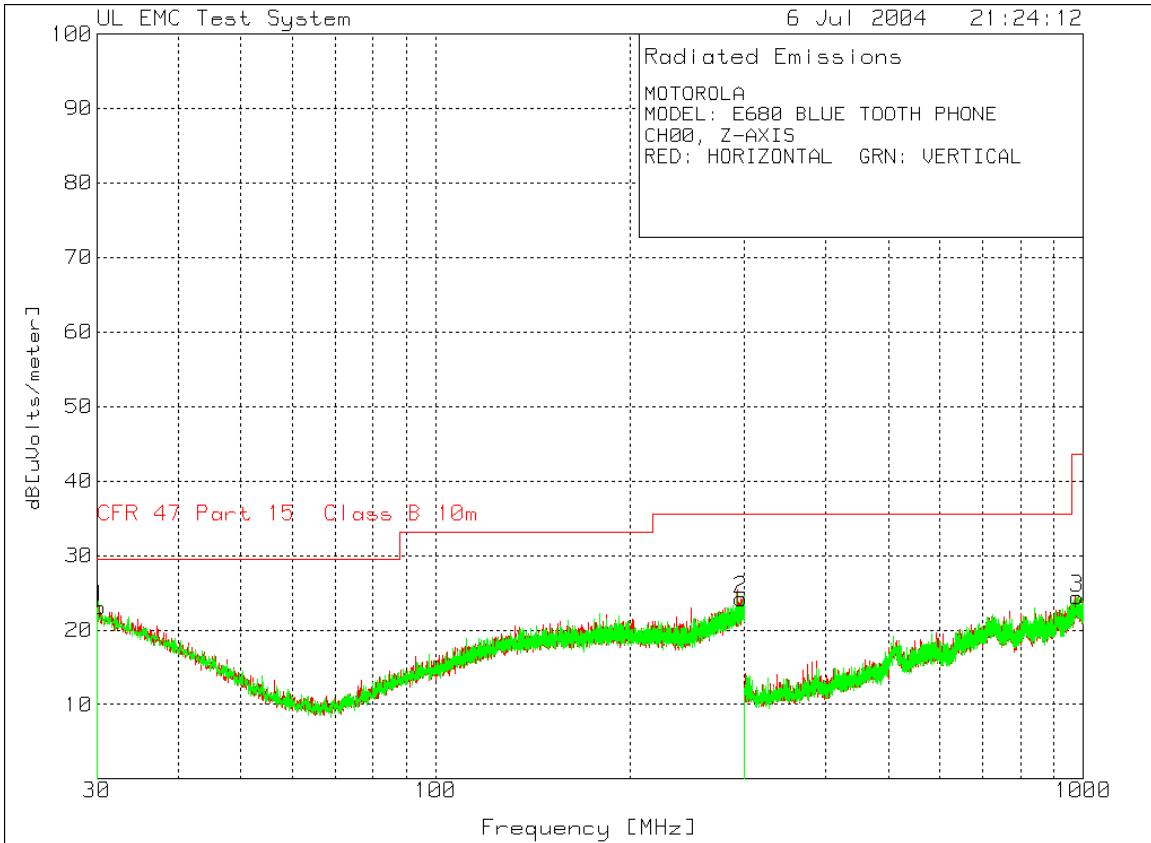


30 -1000MHz Low Channel Dual Polarization Y-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH00 Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor	Transducer Factor	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 2 30 - 300MHz											
1	30.3372	33.7	pk	-26.9	17.9	24.7	29.6	-4.9	209	100	Vert
2	284.8223	32.2	pk	-25.7	17.9	24.4	35.6	-11.2	75	100	Vert
Range: 4 300 - 1000MHz											
3	972.8959	32.2	pk	-31.4	24.2	25	43.5	-18.5	267	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE

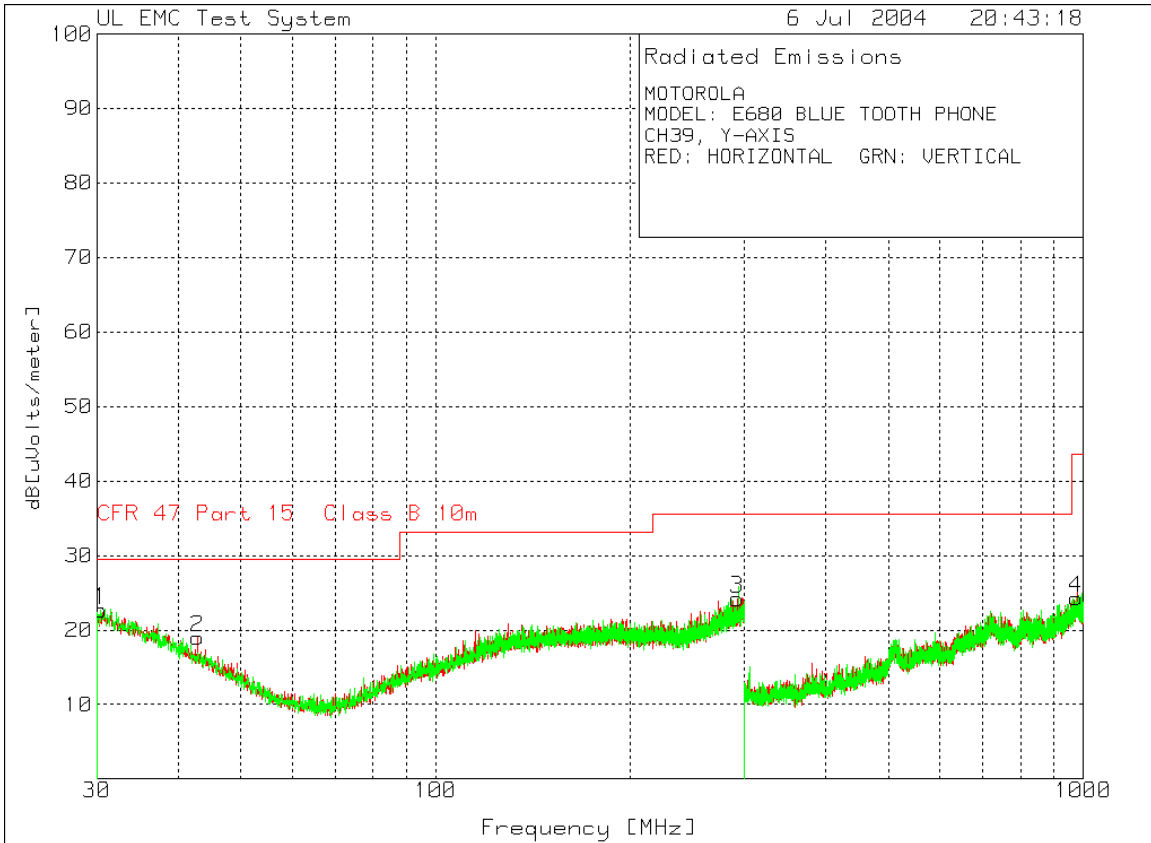


30 -1000MHz Low Channel Dual Polarization Z-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH00 Z-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1 [dB]	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.2698	32.1	pk	-26.9	17.9	23.1	29.6	-6.5	331	100	Horz
2	296.491	31.3	pk	-25.6	18.5	24.2	35.6	-11.4	62	100	Horz
Range: 4 300 - 1000MHz											
3	979.3661	31.3	pk	-31.3	24.4	24.4	43.5	-19.1	164	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE



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

MOTOROLA

MODEL: E680 BLUE TOOTH PHONE

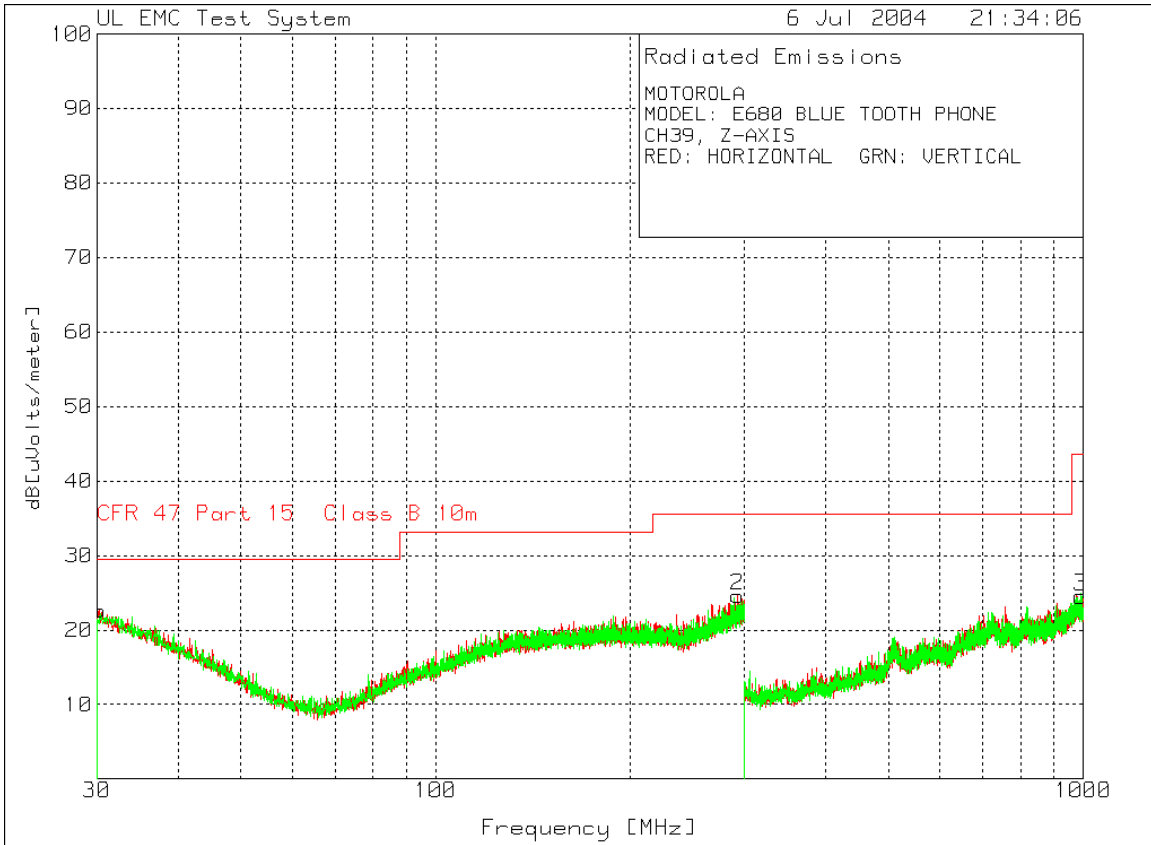
CH39 Y-AXIS

RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1 dB	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.4047	31.8	pk	-26.9	17.8	22.7	29.6	-6.9	83	100	Horz
2	42.8828	33.2	pk	-26.8	12.6	19	29.6	-10.6	349	100	Horz
3	292.3092	31.7	pk	-25.7	18.2	24.2	35.6	-11.4	137	100	Horz
Range: 4 300 - 1000MHz											
4	974.4697	31.5	pk	-31.5	24.3	24.3	43.5	-19.2	157	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

LIMIT 2: NONE

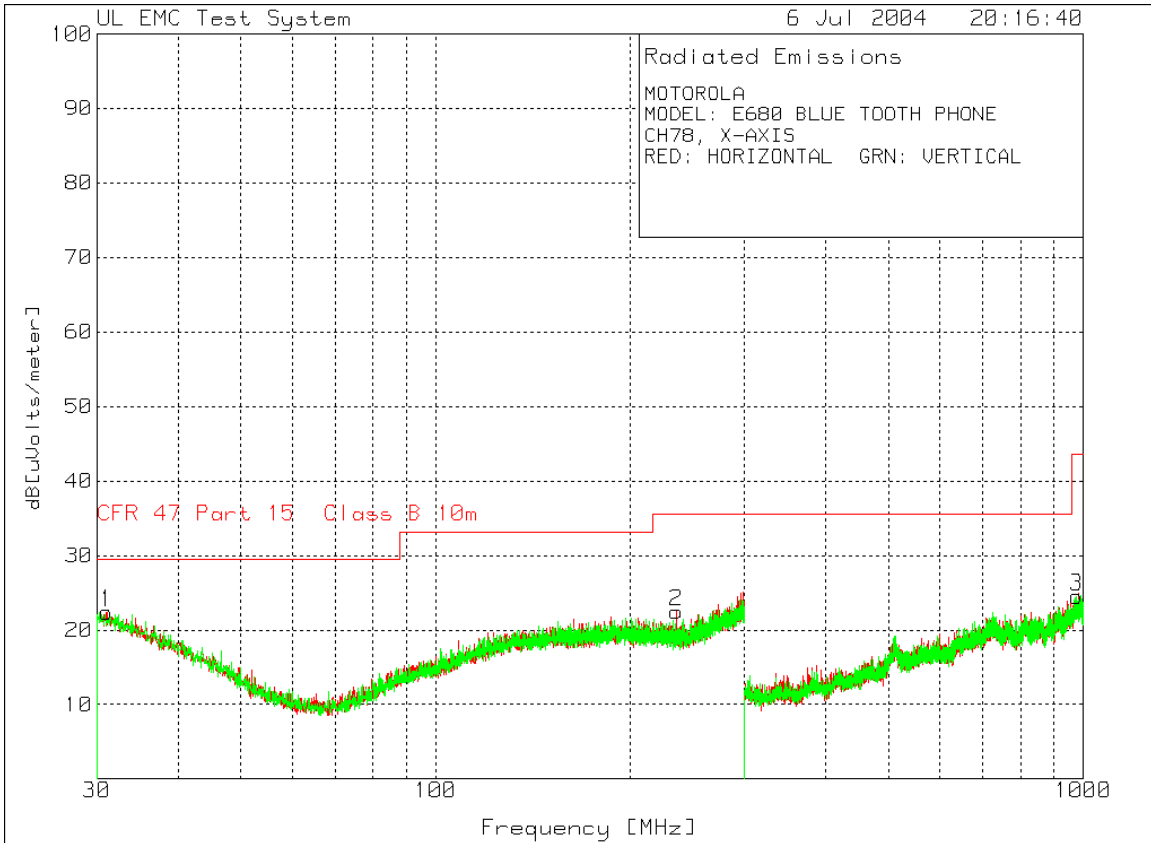


30 -1000MHz Mid Channel Dual Polarization Z-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH39 Z-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.2023	31.6 pk		-26.9	17.9	22.6	29.6	-7	277	100	Horz
2	292.6464	31.9 pk		-25.6	18.3	24.6	35.6	-11	22	100	Horz
Range: 4 300 - 1000MHz											
3	990.0331	31.3 pk		-30.9	24.1	24.5	43.5	-19	202	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE



30 -1000MHz High Channel Dual Polarization X-Orientation

MOTOROLA

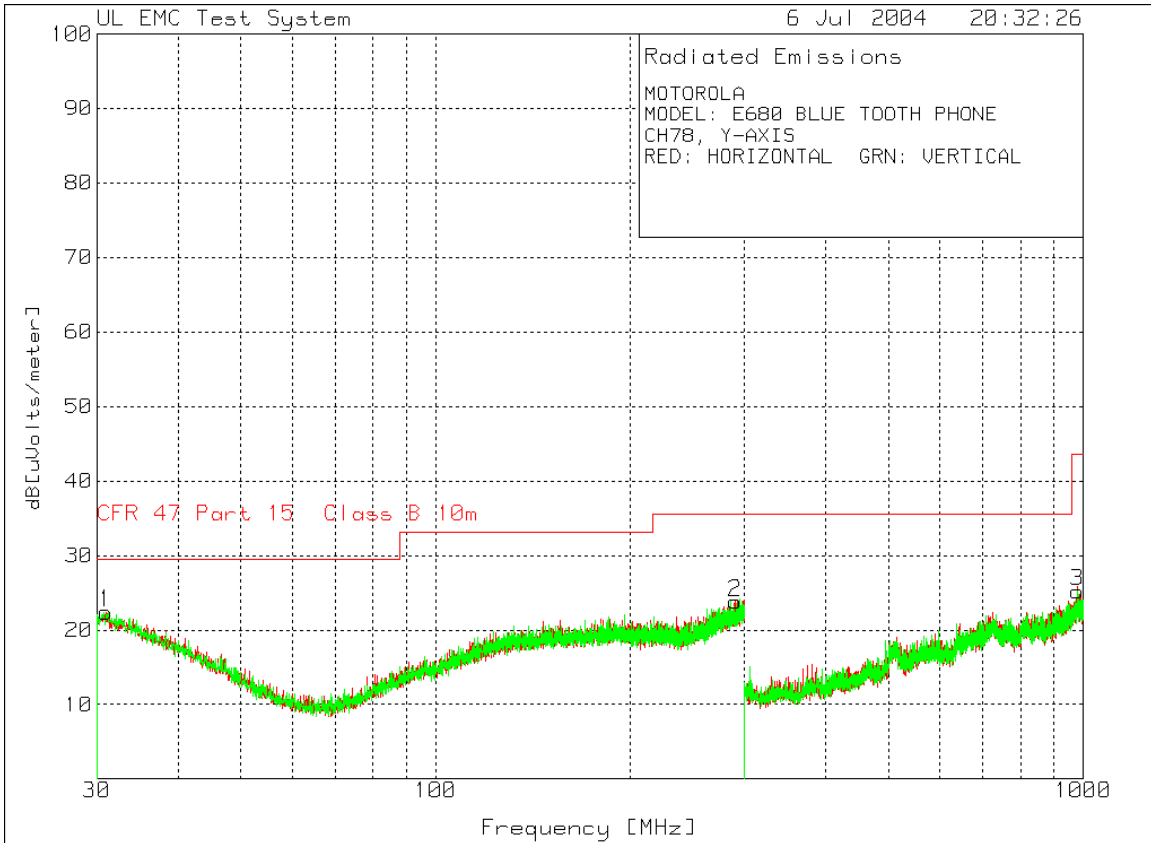
MODEL: E680 BLUE TOOTH PHONE
 CH78 X-AXIS

RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	31.0455	31.7	pk	-26.9	17.6	22.4	29.6	-7.2	76	100	Horz
2	235.2473	33.2	pk	-26	15.3	22.5	35.6	-13.1	49	100	Horz
Range: 4 300 - 1000MHz											
3	977.4425	31.3	pk	-31.2	24.4	24.5	43.5	-19	47	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

LIMIT 2: NONE

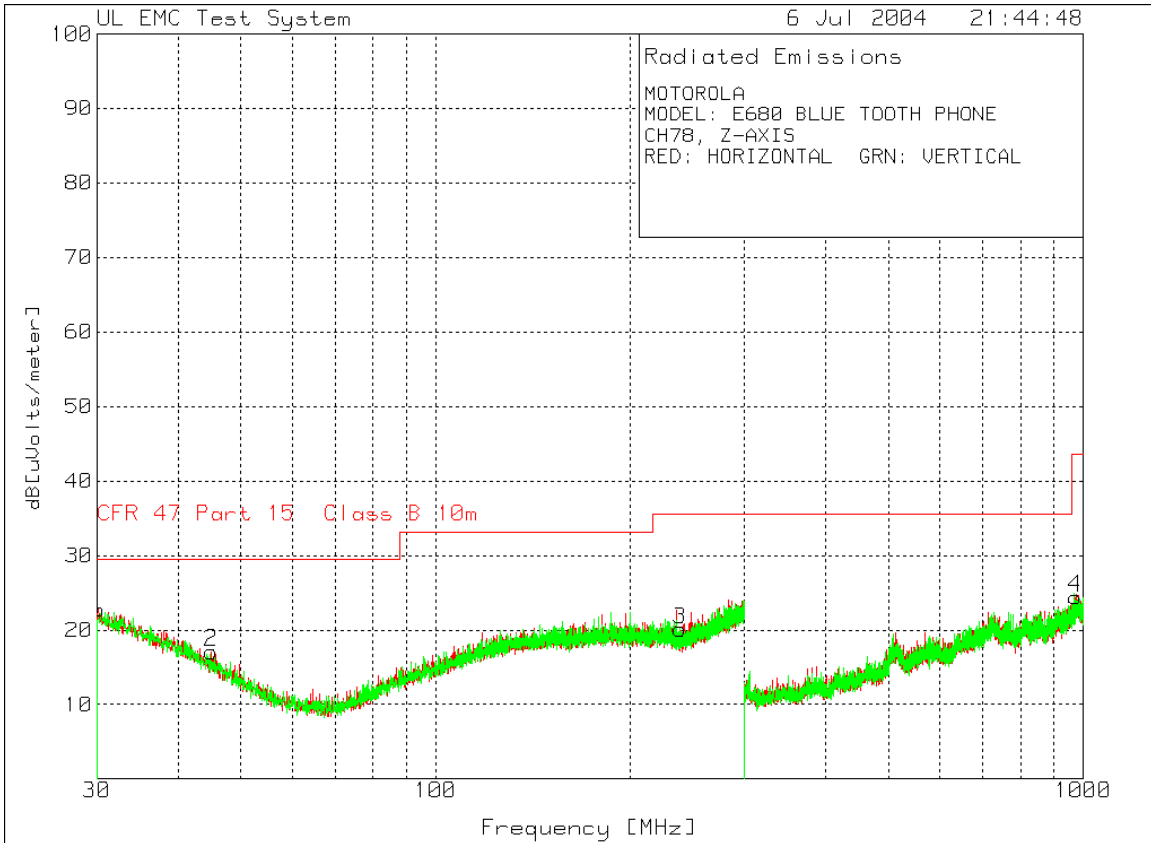


30 -1000MHz High Channel Dual Polarization Y-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH78 Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.9443	31.7 pk		-26.9	17.6	22.4	29.6	-7.2	331	100	Horz
2	290.4206	31.4 pk		-25.7	18.1	23.8	35.6	-11.8	223	100	Horz
Range: 4 300 - 1000MHz											
3	978.6666	32 pk		-31.2	24.4	25.2	43.5	-18.3	122	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE

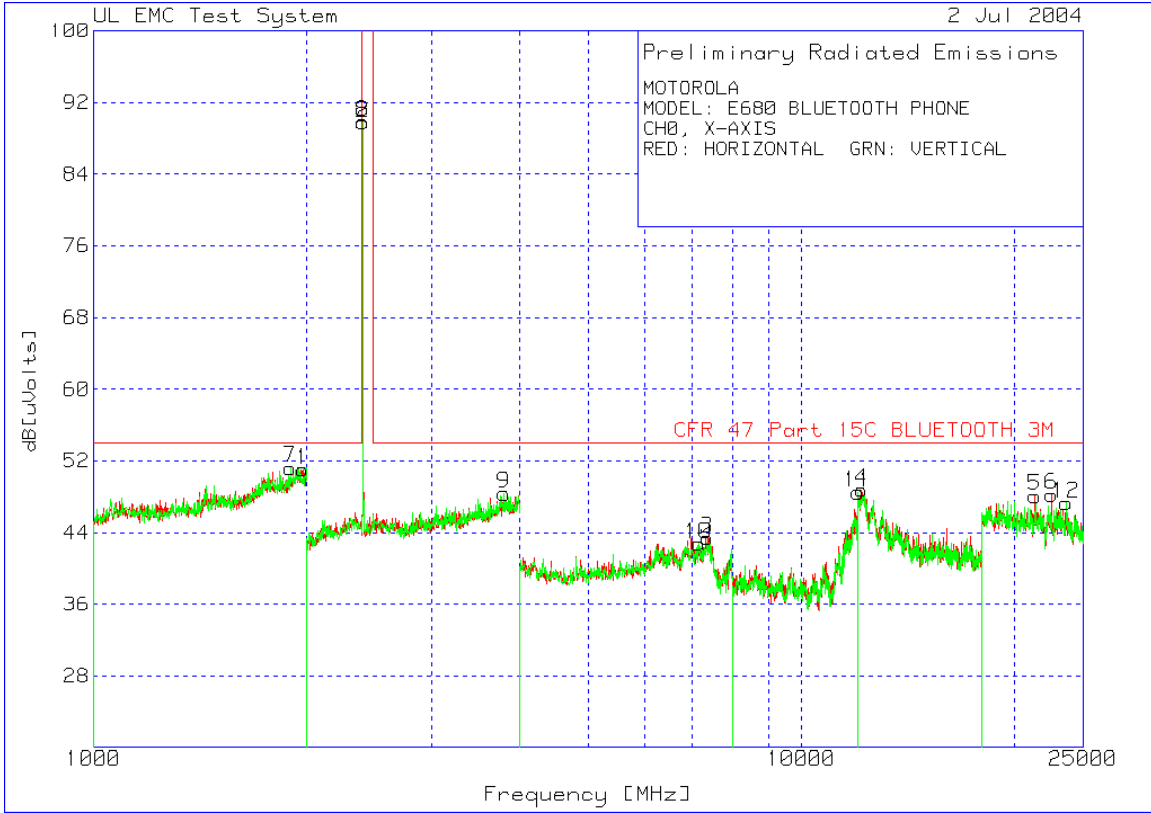


30 -1000MHz High Channel Dual Polarization Z-Orientation

MOTOROLA
 MODEL: E680 BLUE TOOTH PHONE
 CH78 Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts/meter]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range: 1 30 - 300MHz											
1	30.9443	31.7 pk		-26.9	17.6	22.4	29.6	-7.2	331	100	Horz
2	290.4206	31.4 pk		-25.7	18.1	23.8	35.6	-11.8	223	100	Horz
Range: 4 300 - 1000MHz											
3	978.6666	32 pk		-31.2	24.4	25.2	43.5	-18.3	122	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m
 LIMIT 2: NONE

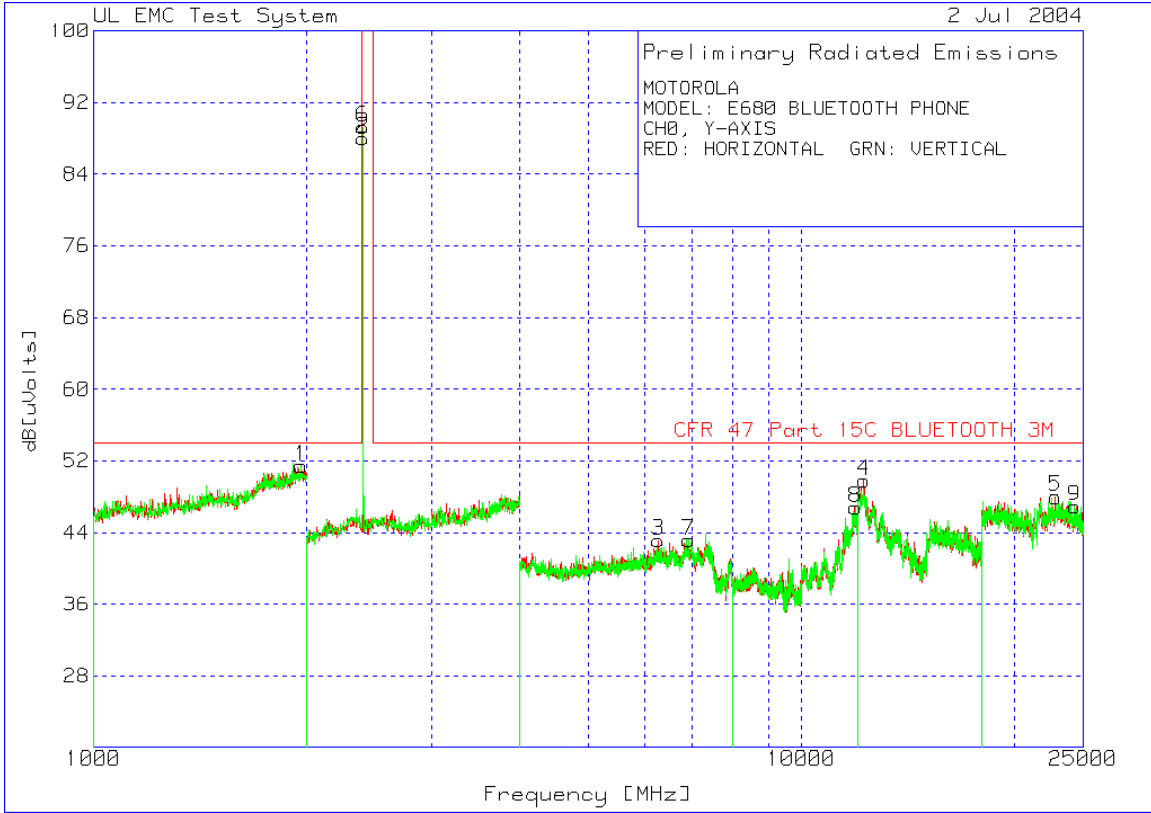


1-25GHz Low Channel X-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH0, X-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1973.948	19.85	pk	3.1	28.1	51.05	54	-2.95	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2400.802	64.65	pk	3.3	21.8	89.75	999	-909.25	100	Horz
4 - 8GHz 4000 - 8000MHz										
3	7358.717	59.79	pk	-47.3	30.9	43.39	54	-10.61	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12156.313	51.27	pk	-41.9	39.4	48.77	54	-5.23	100	Horz
18-26.5GHz 18000 - 25000MHz										
5	21366.733	70	pk	-62.1	40.2	48.1	54	-5.9	100	Horz
6	22559.118	65.81	pk	-58.1	40.5	48.21	54	-5.79	100	Horz
1 - 2GHz 1000 - 2000MHz										
7	1895.792	20.33	pk	3	27.9	51.23	54	-2.77	100	Vert
2 - 4GHz 2000 - 4000MHz										
8	2400.802	64.75	pk	3.3	21.8	89.85	999	-909.15	100	Vert
9	3799.599	20.17	pk	4.1	24.1	48.37	54	-5.63	100	Vert
4 - 8GHz 4000 - 8000MHz										
10	7150.301	60.17	pk	-47	29.6	42.77	54	-11.23	100	Vert
12 - 18GHz 12000 - 18000MHz										
11	12012.024	50.49	pk	-41.4	39.4	48.49	54	-5.51	100	Vert
18-26.5GHz 18000 - 25000MHz										
12	23639.279	63.19	pk	-56.2	40.3	47.29	54	-6.71	100	Vert

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

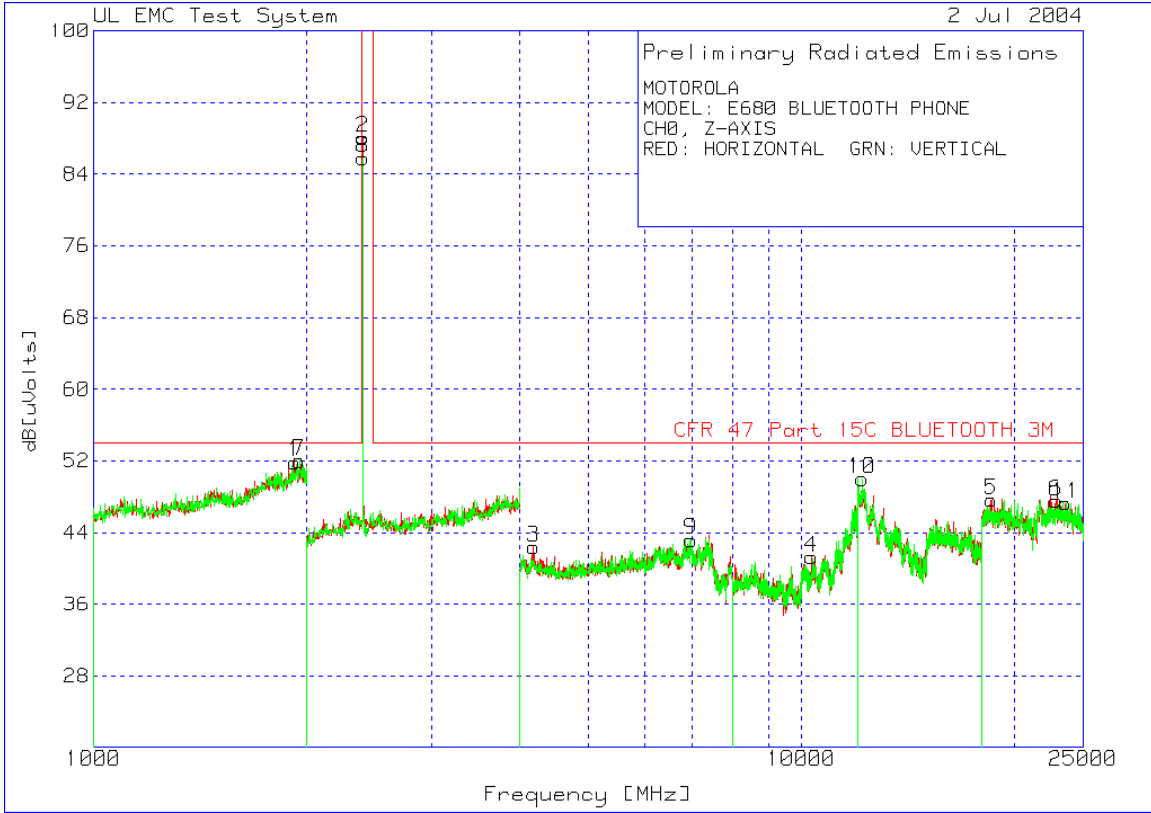


1-25GHz Low Channel Y-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH0, Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1963.928	20.25	pk	3.1	28.1	51.45	54	-2.55	150	Horz
2 - 4GHz 2000 - 4000MHz										
2	2400.802	62.91	pk	3.3	21.8	88.01	999	-910.99	150	Horz
4 - 8GHz 4000 - 8000MHz										
3	6270.27	61.42	pk	-47.5	29.2	43.12	54	-10.88	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12240.24	51.22	pk	-40.8	39.4	49.82	54	-4.18	149	Horz
18-26.5GHz 18000 - 25000MHz										
5	22834.835	64.29	pk	-56.7	40.4	47.99	54	-6.01	100	Horz
2 - 4GHz 2000 - 4000MHz										
6	2400.802	64.17	pk	3.3	21.8	89.27	999	-909.73	100	Vert
4 - 8GHz 4000 - 8000MHz										
7	6922.923	60.54	pk	-46.5	29.1	43.14	54	-10.86	150	Vert
8 - 12GHz 8000 - 12000MHz										
8	11927.928	48.38	pk	-39.2	37.6	46.78	54	-7.22	100	Vert
18-26.5GHz 18000 - 25000MHz										
9	24313.313	67.24	pk	-60.6	40.3	46.94	54	-7.06	100	Vert

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



1-25GHz Low Channel Z-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH0, Z-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1921.844	20.87	pk		3	28	51.87	54	-2.13	150 Horz
2 - 4GHz 2000 - 4000MHz										
2	2400.802	62.96	pk		3.3	21.8	88.06	999	-910.94	100 Horz
4 - 8GHz 4000 - 8000MHz										
3	4180.18	66.1	pk		-52	28.3	42.4	54	-11.6	149 Horz
8 - 12GHz 8000 - 12000MHz										
4	10330.33	53.87	pk		-48.8	36.2	41.27	54	-12.73	149 Horz
18-26.5GHz 18000 - 25000MHz										
5	18525.526	74.55	pk		-67	40.1	47.65	54	-6.35	149 Horz
6	22869.87	63.76	pk		-56.6	40.4	47.56	54	-6.44	149 Horz
1 - 2GHz 1000 - 2000MHz										
7	1951.904	20.82	pk		3.1	28.1	52.02	54	-1.98	150 Vert
2 - 4GHz 2000 - 4000MHz										
8	2400.802	60.71	pk		3.3	21.8	85.81	999	-913.19	100 Vert
4 - 8GHz 4000 - 8000MHz										
9	6982.983	60	pk		-46.1	29.3	43.2	54	-10.8	100 Vert
12 - 18GHz 12000 - 18000MHz										
10	12174.174	52.3	pk		-41.7	39.4	50	54	-4	150 Vert
18-26.5GHz 18000 - 25000MHz										
11	23612.613	63.15	pk		-56.2	40.3	47.25	54	-6.75	149 Vert

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



1-25GHz Mid-Channel X-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH39, X-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1937.876	20.28 pk		3	28	51.28	54	-2.72	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	66.14 pk		3.3	21.9	91.34	999	-907.66	100	Horz
4 - 8GHz 4000 - 8000MHz										
3	7318.637	60.37 pk		-47.1	30.6	43.87	54	-10.13	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12048.096	51.62 pk		-42.1	39.4	48.92	54	-5.08	100	Horz
18-26.5GHz 18000 - 25000MHz										
5	18364.729	73.52 pk		-66.6	40	46.92	54	-7.08	100	Horz
6	23414.83	62.39 pk		-55.8	40.3	46.89	54	-7.11	100	Horz
2 - 4GHz 2000 - 4000MHz										
7	2440.882	65.61 pk		3.3	21.9	90.81	999	-908.19	100	Vert
12 - 18GHz 12000 - 18000MHz										
8	12216.433	51.15 pk		-41.1	39.4	49.45	54	-4.55	100	Vert
18-26.5GHz 18000 - 25000MHz										
9	21408.818	68.85 pk		-62.1	40.3	47.05	54	-6.95	100	Vert

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

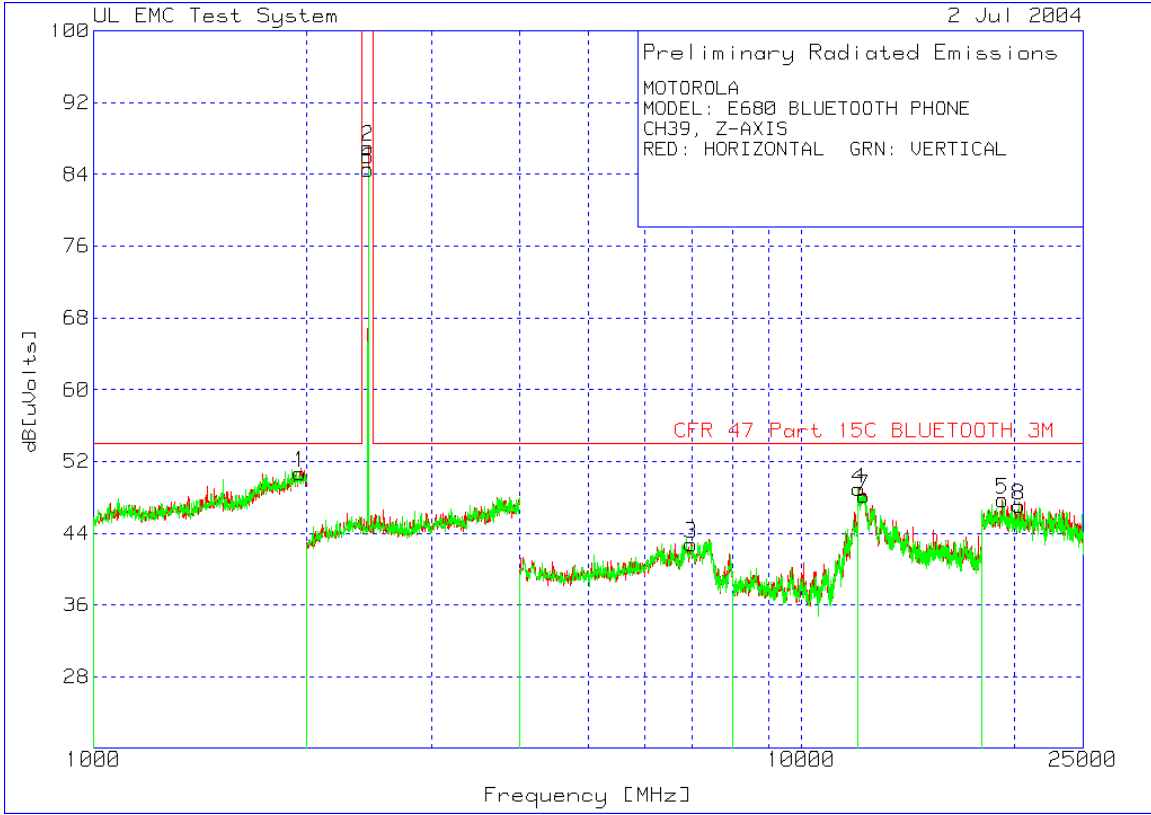


1-25GHz Mid-Channel Y-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH39, Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level [dB[uVolts]]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1893.788	20.07	pk	3	27.9	50.97	54	-3.03	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	63.92	pk	3.3	21.9	89.12	999	-909.88	100	Horz
4 - 8GHz 4000 - 8000MHz										
3	7406.814	59.98	pk	-47.1	31.1	43.98	54	-10.02	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12264.529	50.71	pk	-40.9	39.4	49.21	54	-4.79	100	Horz
18-26.5GHz 18000 - 25000MHz										
5	20903.808	71.21	pk	-64.1	40.1	47.21	54	-6.79	100	Horz
1 - 2GHz 1000 - 2000MHz										
6	1949.9	20.63	pk	3.1	28	51.73	54	-2.27	100	Vert
2 - 4GHz 2000 - 4000MHz										
7	2440.882	62.71	pk	3.3	21.9	87.91	999	-911.09	100	Vert
12 - 18GHz 12000 - 18000MHz										
8	12252.505	50.19	pk	-40.7	39.4	48.89	54	-5.11	100	Vert
18-26.5GHz 18000 - 25000MHz										
9	21675.351	68.26	pk	-61	40.4	47.66	54	-6.34	100	Vert

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

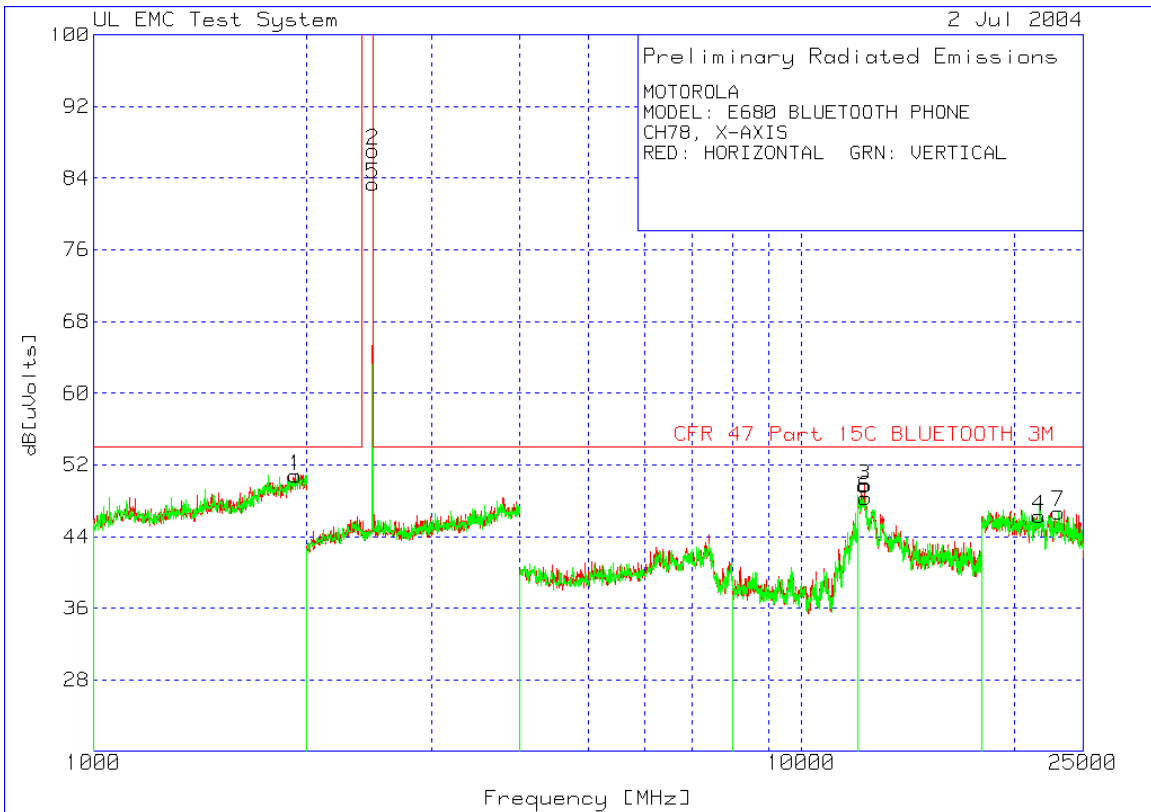


1-25GHz Mid-Channel Z-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH39, Z-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1955.912	19.52	pk	3.1	28.1	50.72	54	-3.28	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	61.86	pk	3.3	21.9	87.06	999	-911.94	100	Horz
4 - 8GHz 4000 - 8000MHz										
3	6981.964	59.62	pk	-46.1	29.3	42.82	54	-11.18	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12060.12	51.75	pk	-42.2	39.4	48.95	54	-5.05	100	Horz
18-26.5GHz 18000 - 25000MHz										
5	19220.441	75.44	pk	-68	40.3	47.74	54	-6.26	100	Horz
2 - 4GHz 2000 - 4000MHz										
6	2440.882	59.37	pk	3.3	21.9	84.57	999	-914.43	100	Vert
12 - 18GHz 12000 - 18000MHz										
7	12240.481	49.53	pk	-40.8	39.4	48.13	54	-5.87	100	Vert
18-26.5GHz 18000 - 25000MHz										
8	20272.545	74.28	pk	-67.4	40.2	47.08	54	-6.92	100	Vert

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

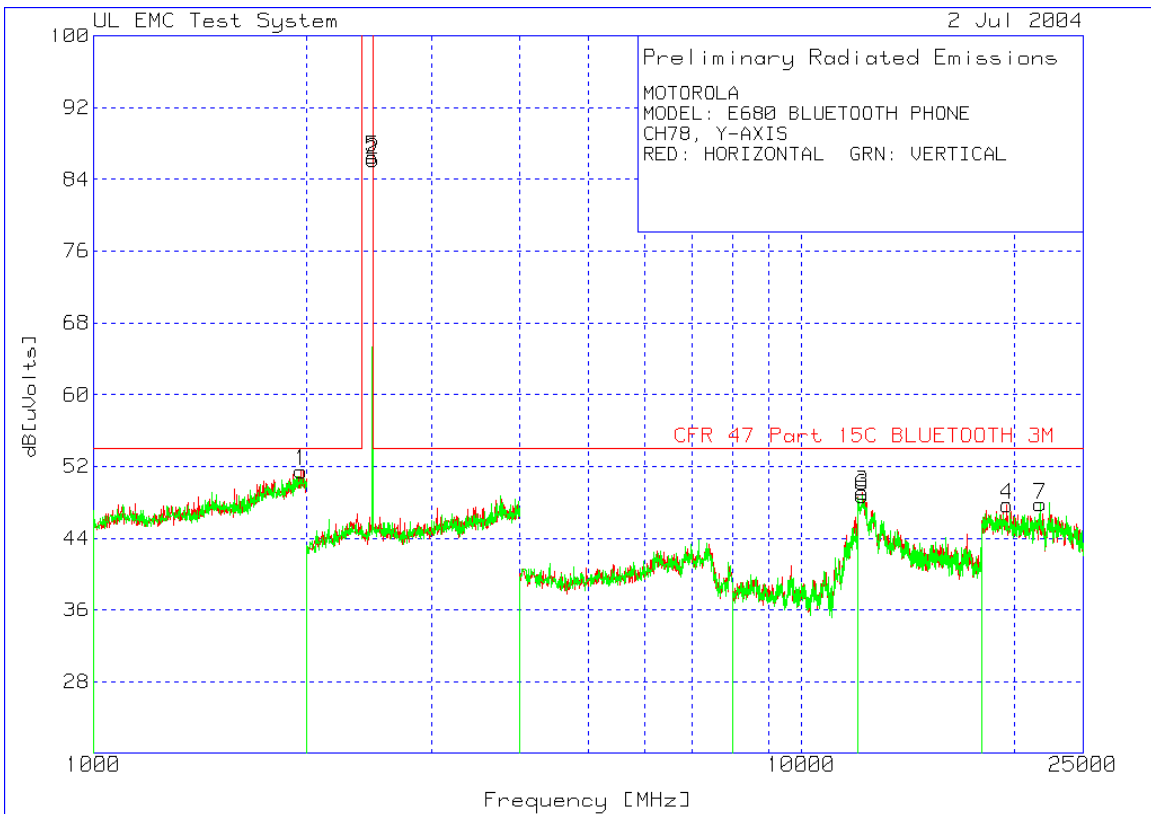


1-25GHz High-Channel X-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH78, X-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1927.856	19.82	pk	3	28	50.82	54	-3.18	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	61.79	pk	3.3	22	87.09	999	-911.91	100	Horz
12 - 18GHz 12000 - 18000MHz										
3	12264.53	51.2	pk	-40.9	39.4	49.7	54	-4.3	100	Horz
18-26.5GHz 18000 - 25000MHz										
4	21661.32	66.88	pk	-61	40.4	46.28	54	-7.72	100	Horz
2 - 4GHz 2000 - 4000MHz										
5	2480.962	58.05	pk	3.3	22	83.35	999	-915.65	100	Vert
12 - 18GHz 12000 - 18000MHz										
6	12300.6	50.23	pk	-41.3	39.4	48.33	54	-5.67	100	Vert
18-26.5GHz 18000 - 25000MHz										
7	23050.1	62.72	pk	-56.3	40.3	46.72	54	-7.28	100	Vert

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

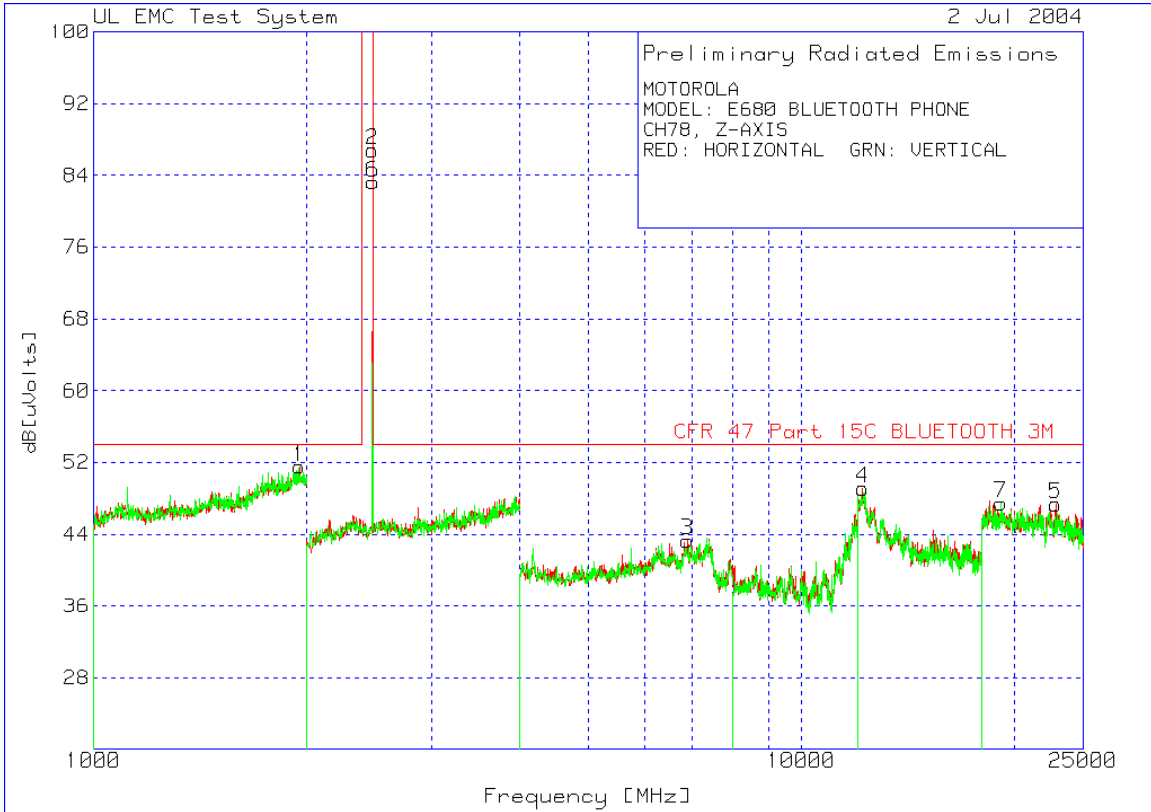


1-25GHz High-Channel Y-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH78, Y-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1963.928	20.27	pk	3.1	28.1	51.47	54	-2.53	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	60.89	pk	3.3	22	86.19	999	-912.81	100	Horz
12 - 18GHz 12000 - 18000MHz										
3	12192.385	51.12	pk	-41.4	39.4	49.12	54	-4.88	100	Horz
18-26.5GHz 18000 - 25000MHz										
4	19501.002	75.94	pk	-68.5	40.3	47.74	54	-6.26	100	Horz
2 - 4GHz 2000 - 4000MHz										
5	2476.954	61.19	pk	3.3	22	86.49	999	-912.51	100	Vert
12 - 18GHz 12000 - 18000MHz										
6	12180.361	50.93	pk	-41.6	39.4	48.73	54	-5.27	100	Vert
18-26.5GHz 18000 - 25000MHz										
7	21717.435	68.3	pk	-60.9	40.4	47.8	54	-6.2	100	Vert

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



1-25GHz High-Channel Z-Orientation

MOTOROLA
 MODEL: E680 BLUETOOTH PHONE
 CH78, Z-AXIS
 RED: HORIZONTAL GRN: VERTICAL

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type [dB]	Gain/Loss Factor [dB]	Transducer Factor	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
1 - 2GHz 1000 - 2000MHz										
1	1951.904	20.34	pk	3.1	28.1	51.54	54	-2.46	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2476.954	61.54	pk	3.3	22	86.84	999	-912.16	100	Horz
4 - 8GHz 4000 - 8000MHz										
3	6893.788	60.31	pk	-46.1	29.1	43.31	54	-10.69	100	Horz
12 - 18GHz 12000 - 18000MHz										
4	12204.409	50.92	pk	-41.2	39.4	49.12	54	-4.88	100	Horz
18-26.5GHz 18000 - 25000MHz										
5	22853.707	63.56	pk	-56.6	40.4	47.36	54	-6.64	100	Horz
2 - 4GHz 2000 - 4000MHz										
6	2480.962	57.96	pk	3.3	22	83.26	999	-915.74	100	Vert
18-26.5GHz 18000 - 25000MHz										
7	19122.244	75.57	pk	-68.3	40.2	47.47	54	-6.53	100	Vert

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

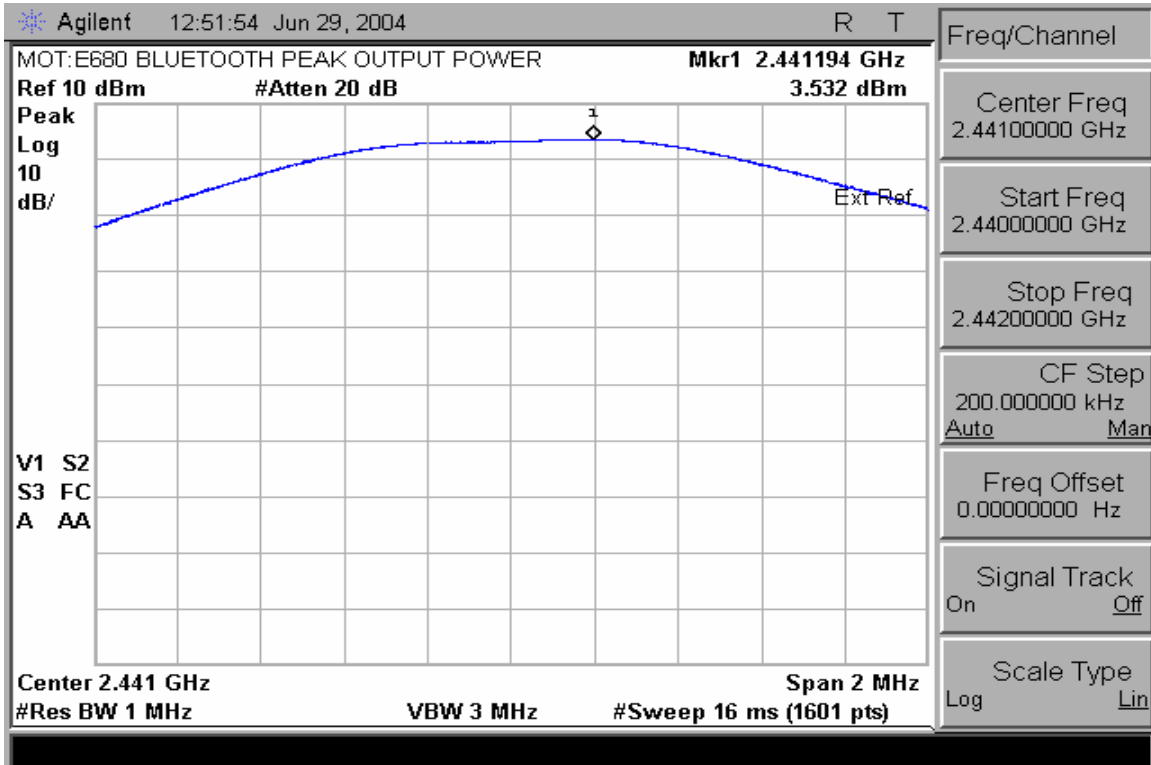
PEAK OUTPUT POWER

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

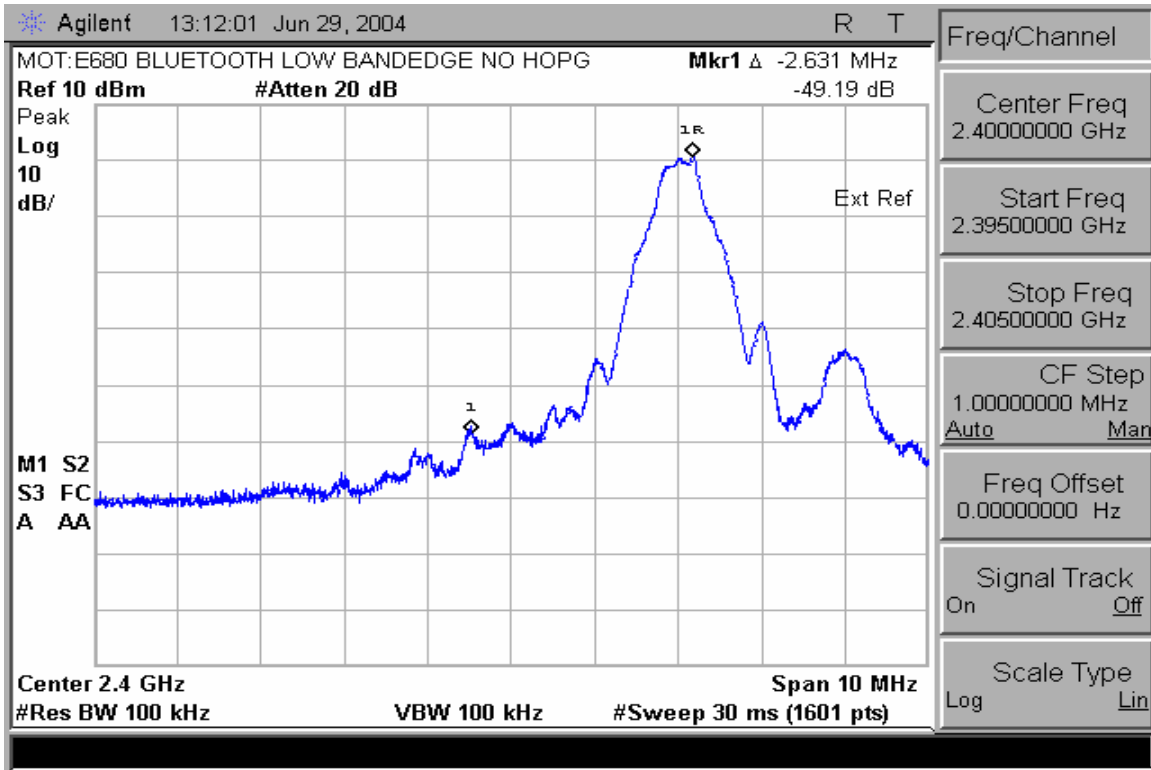
CFR 47 Part 15.247

Measurement Procedure

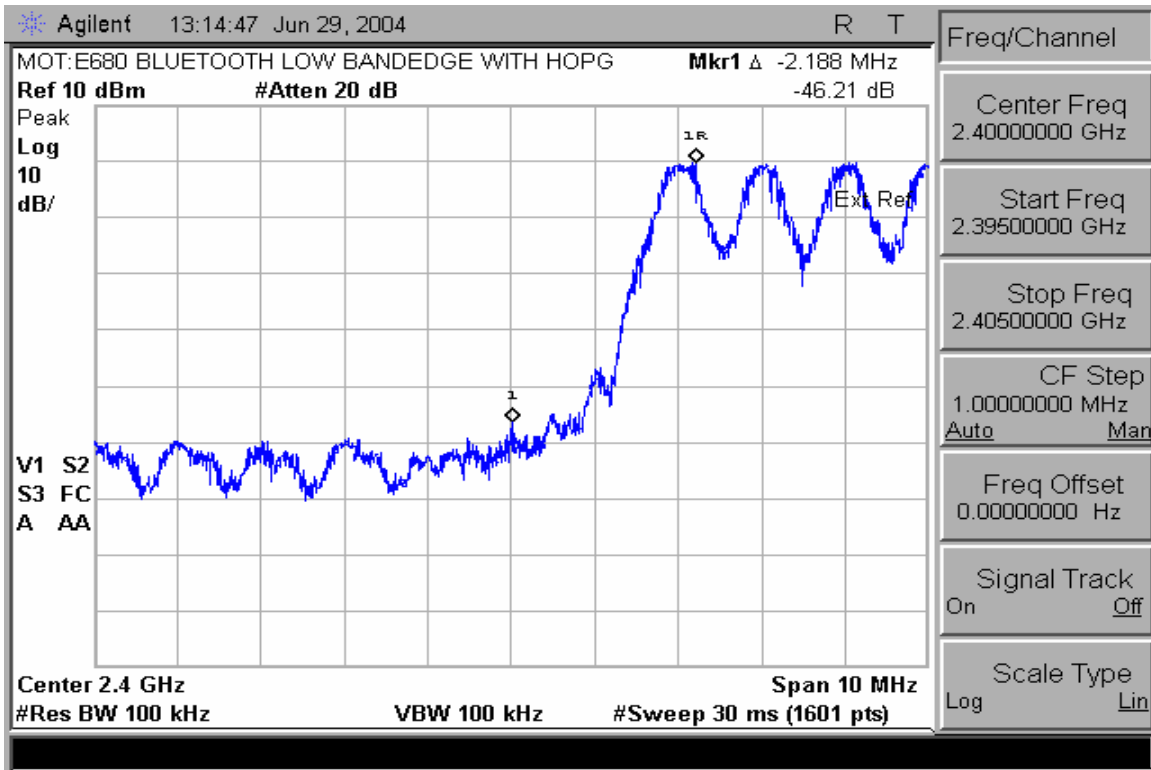
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

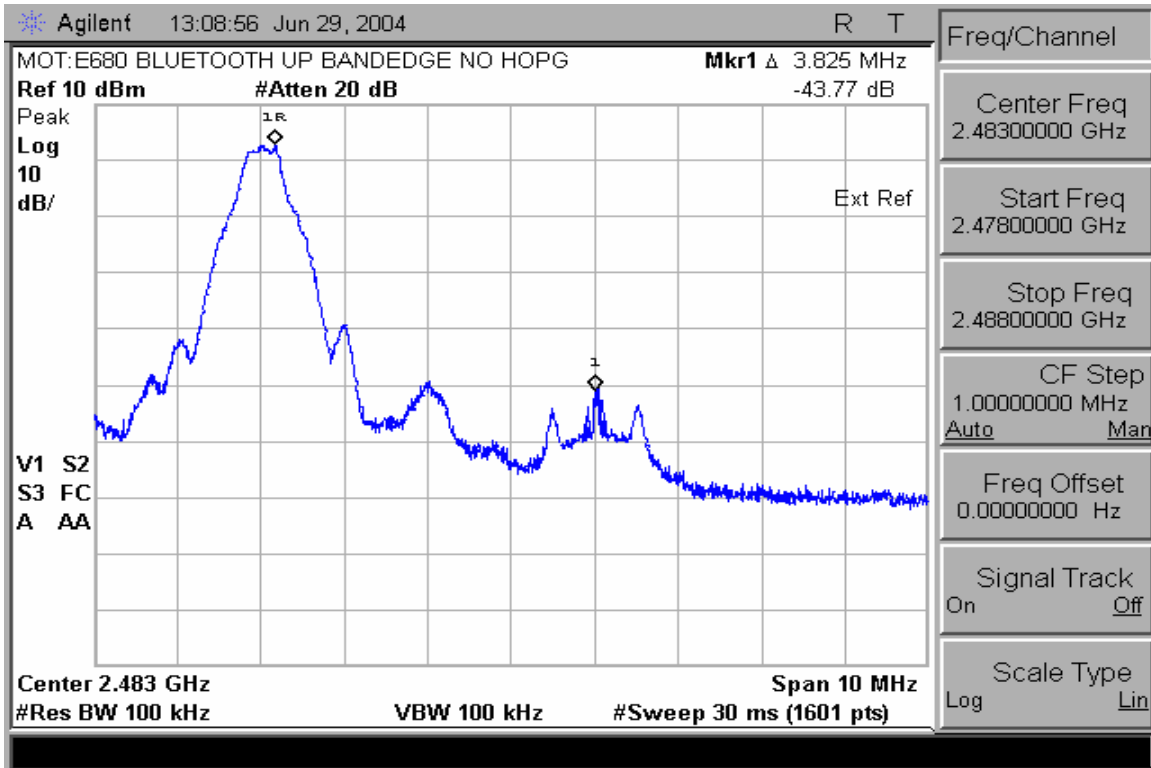
See Attached:



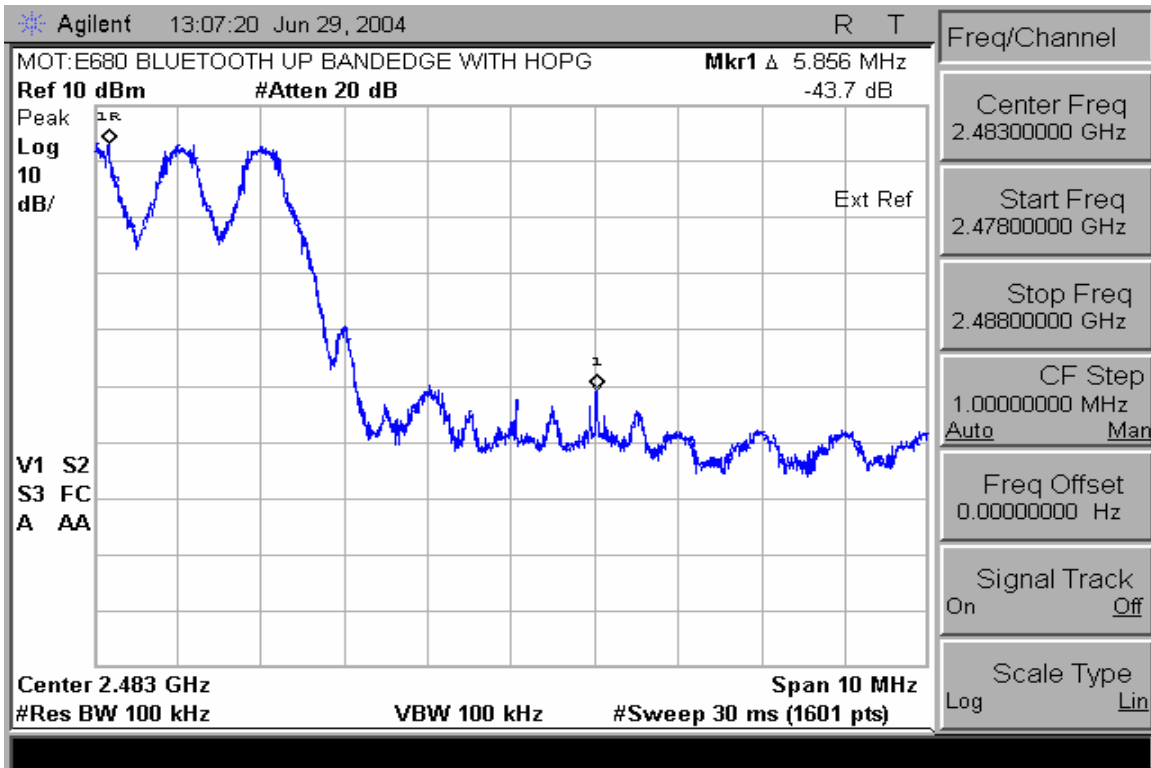
Low Band Edge with Hopping Disabled



Low Band Edge with Hopping Enabled



High Band Edge with Hopping Disabled



High Band Edge with Hopping Enabled

SPURIOUS RF CONDUCTED EMISSIONS

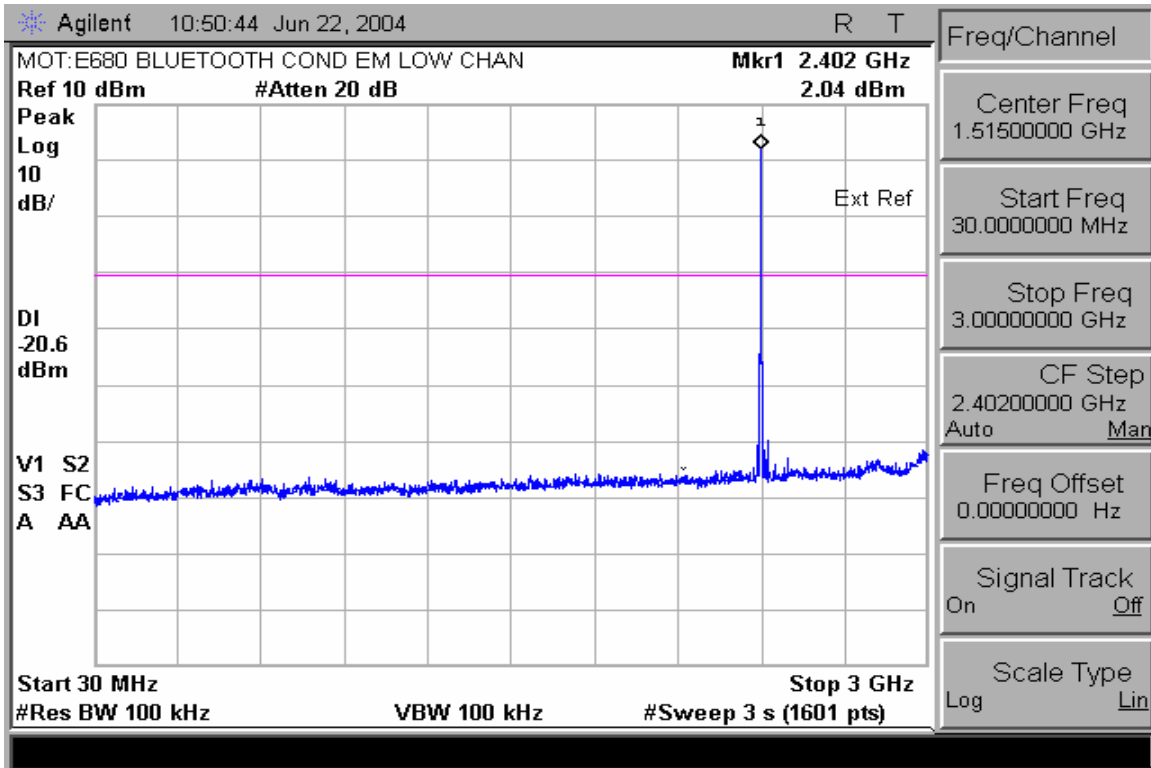
CFR 47 Part 15.247

Measurement Procedure

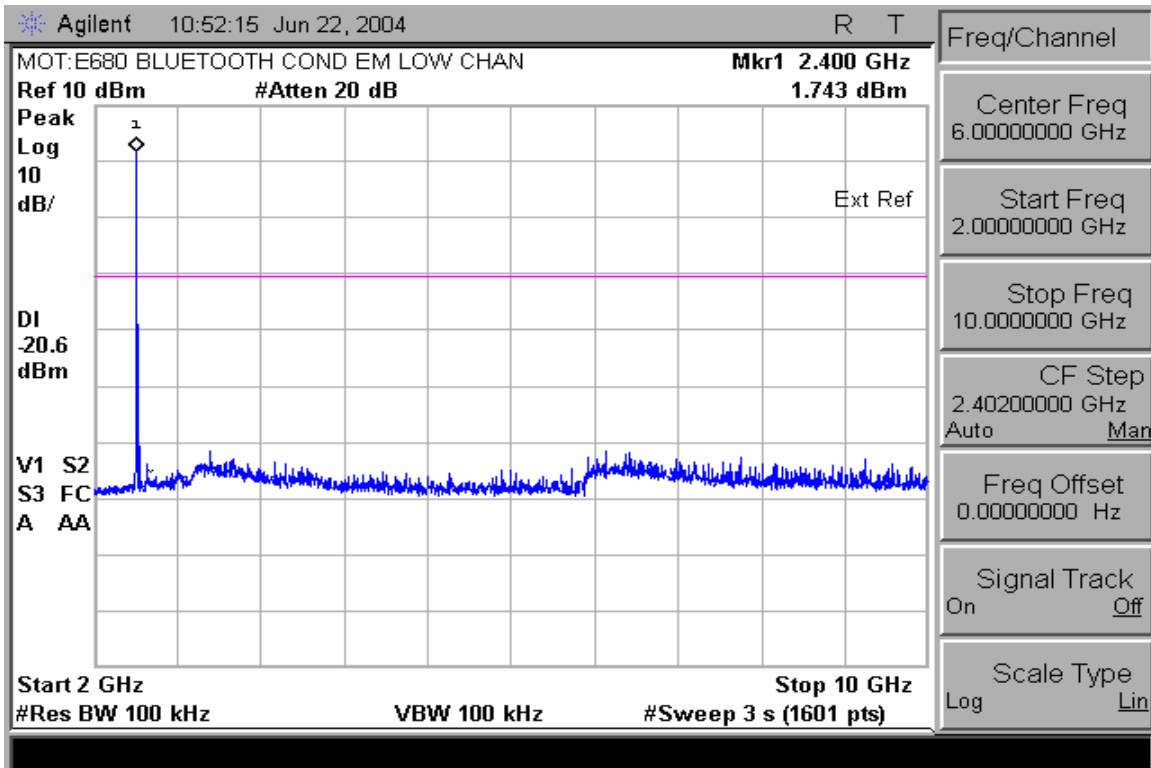
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

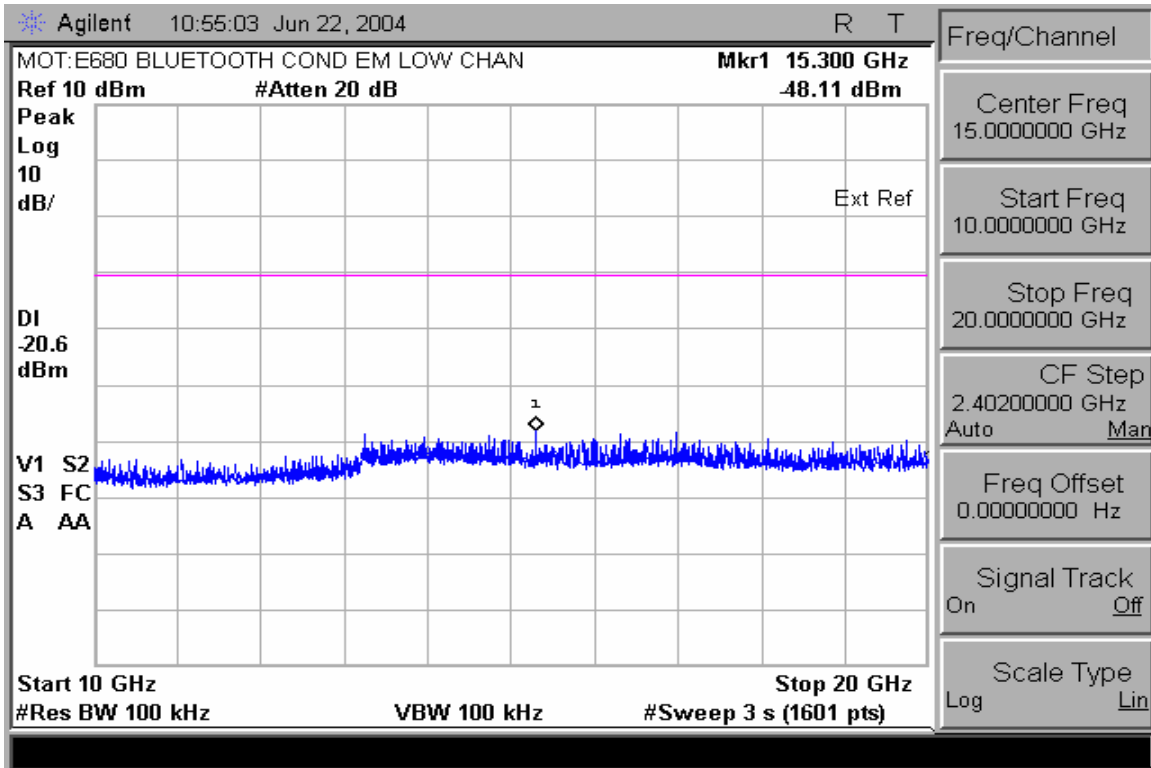
See attached:



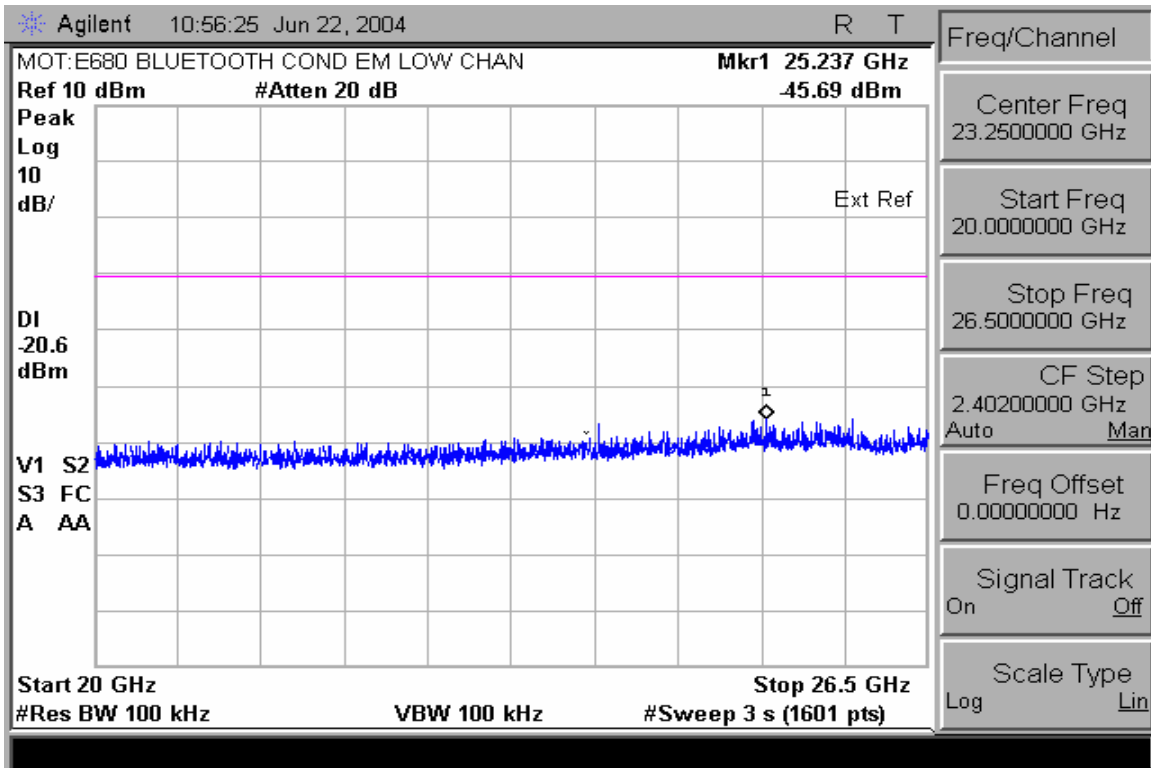
Conducted Spurious Emissions 30-3000MHz (Low Channel Enabled)



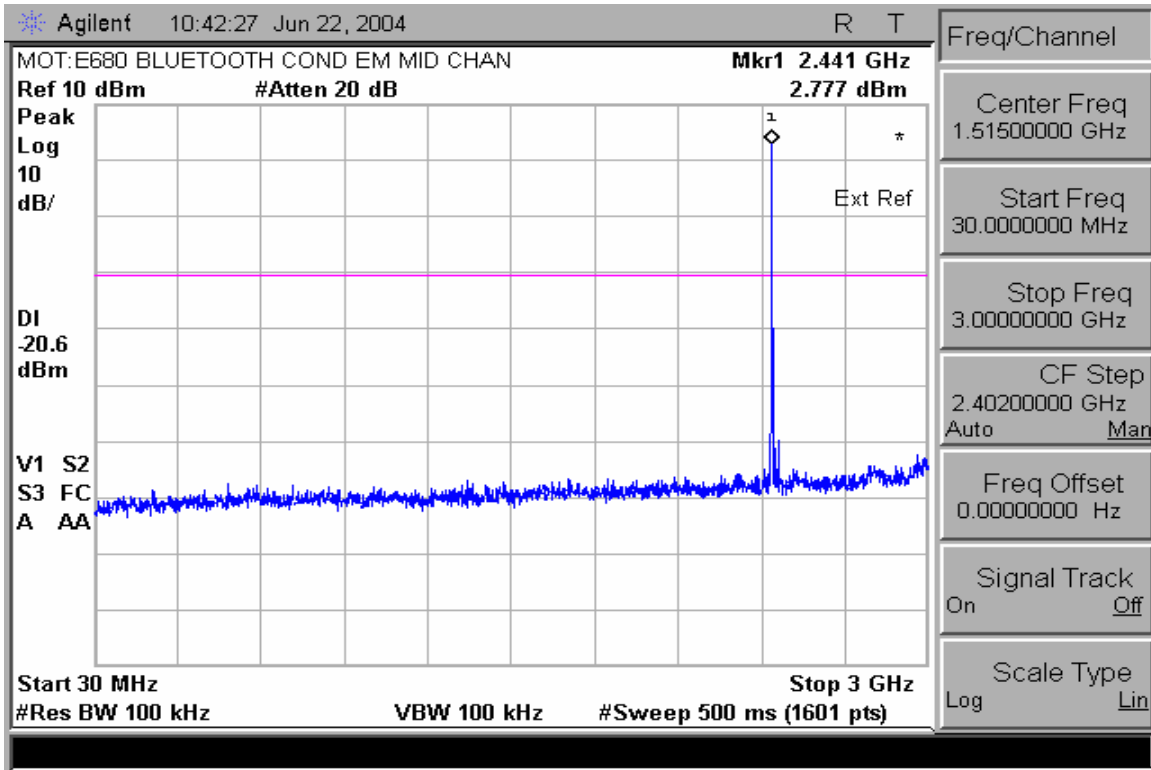
Conducted Spurious Emissions 2-10GHz (Low Channel Enabled)



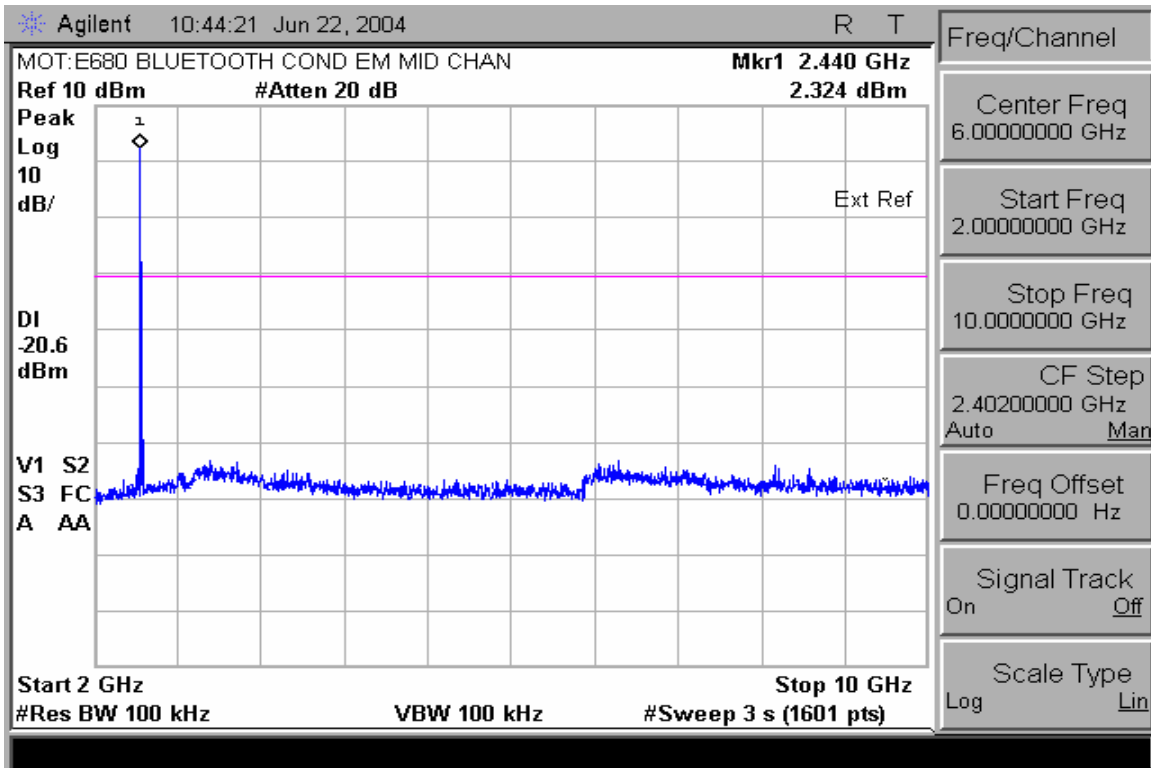
Conducted Spurious Emissions 10-20GHz (Low Channel Enabled)



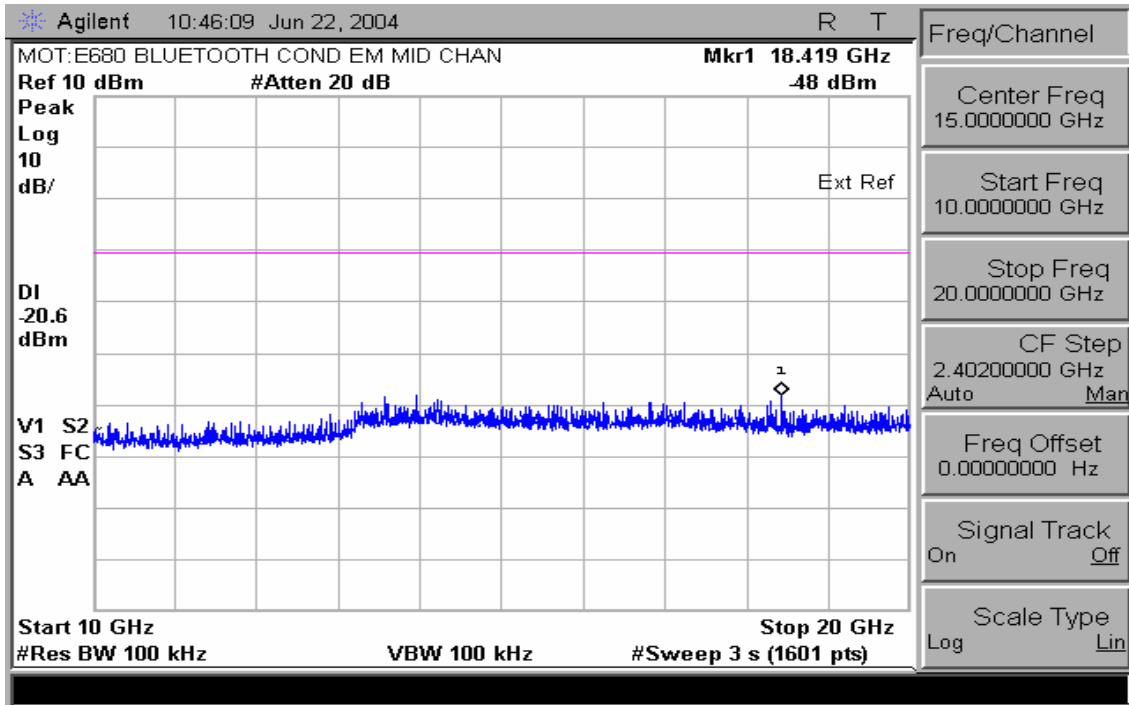
Conducted Spurious Emissions 20-26.5GHz (Low Channel Enabled)



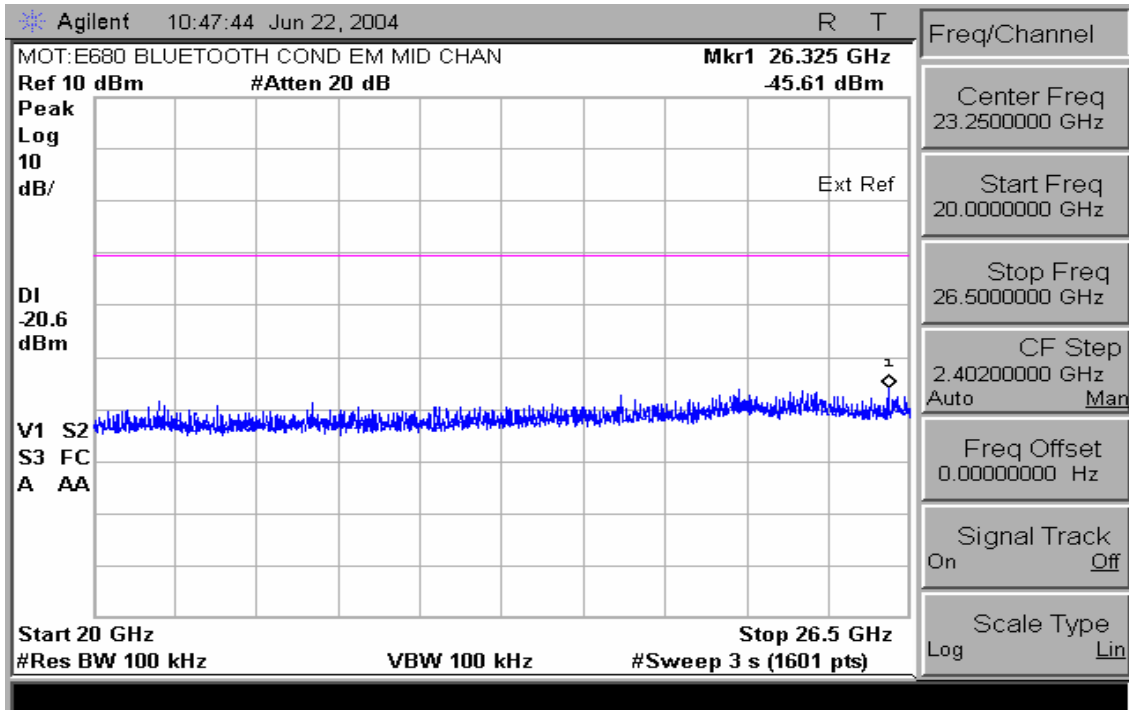
Conducted Spurious Emissions 30-3000MHz (Mid Channel Enabled)



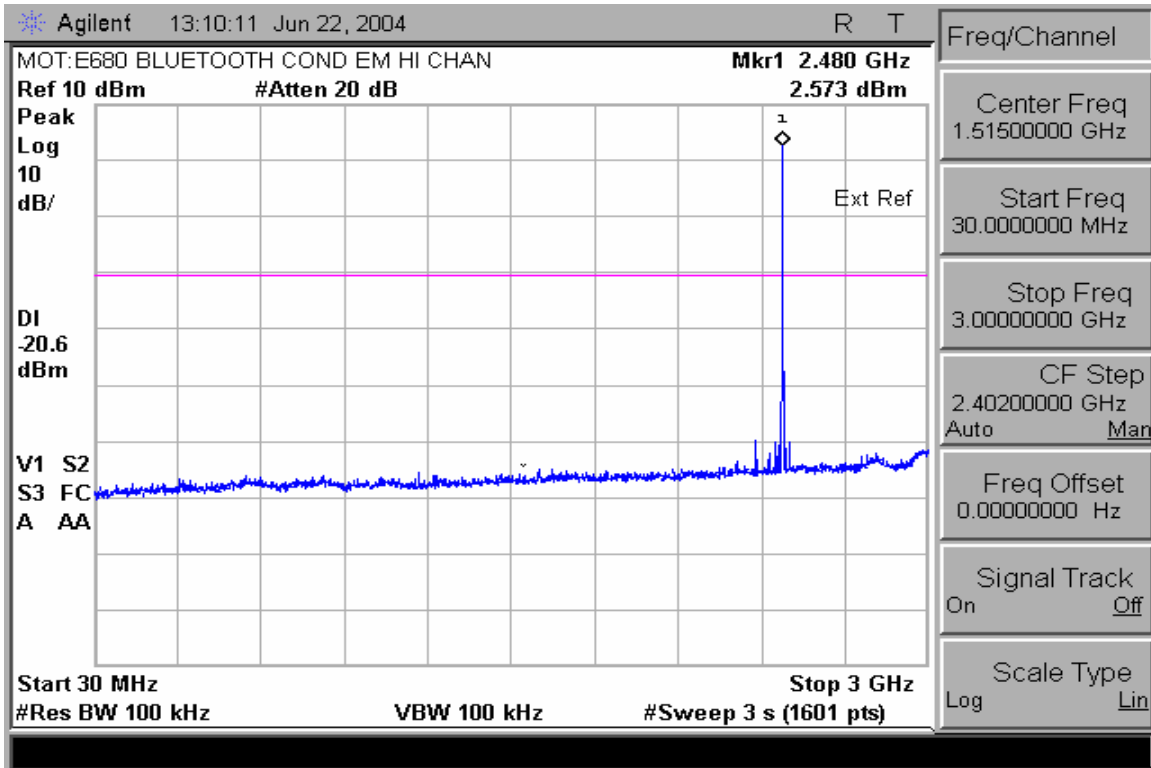
Conducted Spurious Emissions 2-10GHz (Mid Channel Enabled)



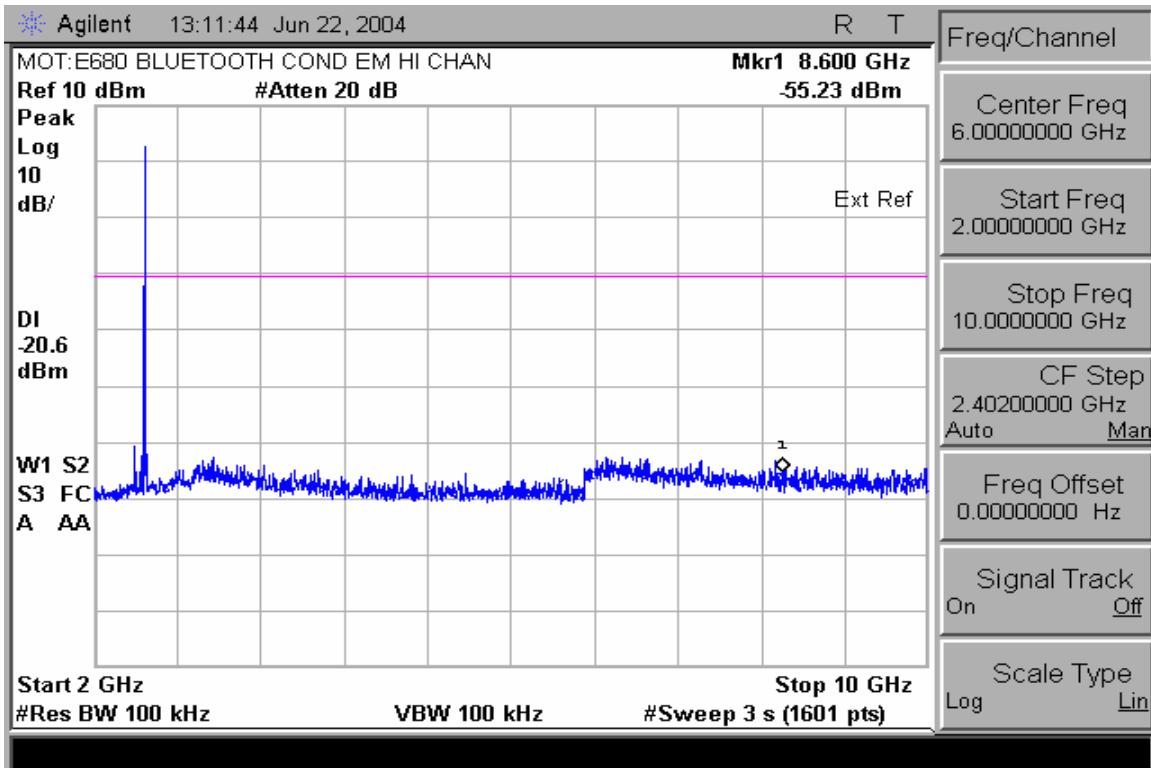
Conducted Spurious Emissions 10-20GHz (Mid Channel Enabled)



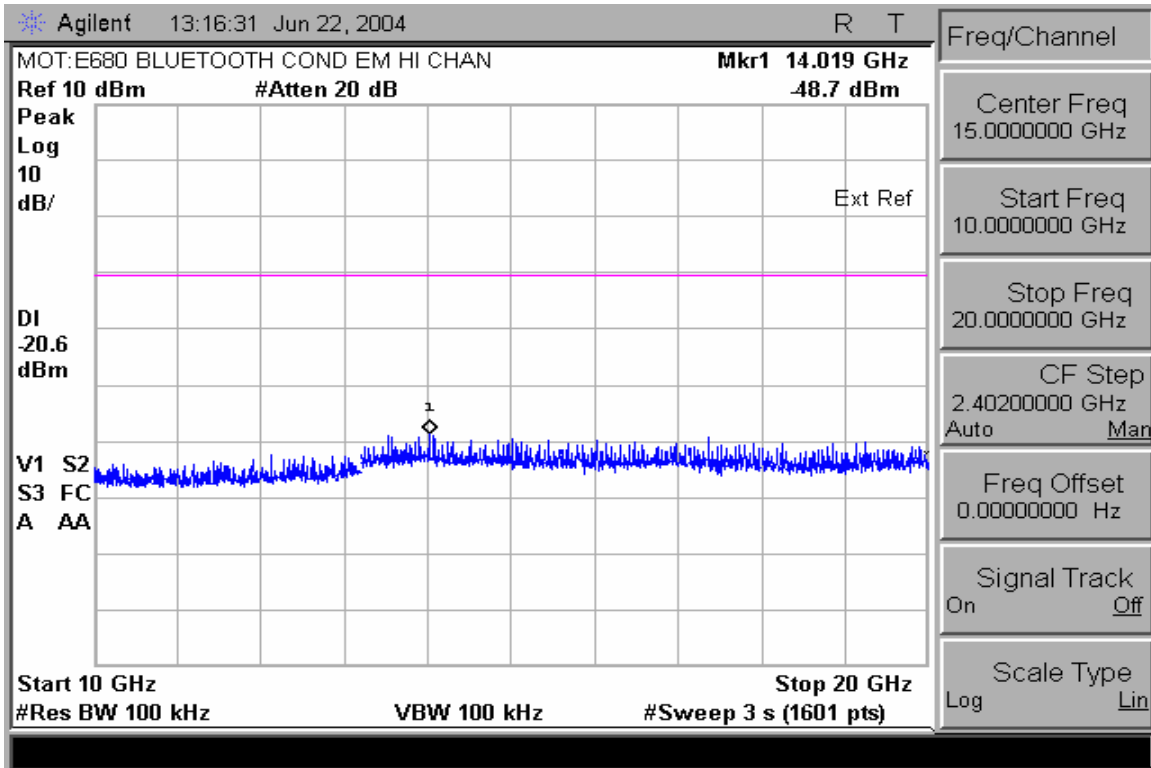
Conducted Spurious Emissions 20-26.5GHz (Mid Chan Enabled)



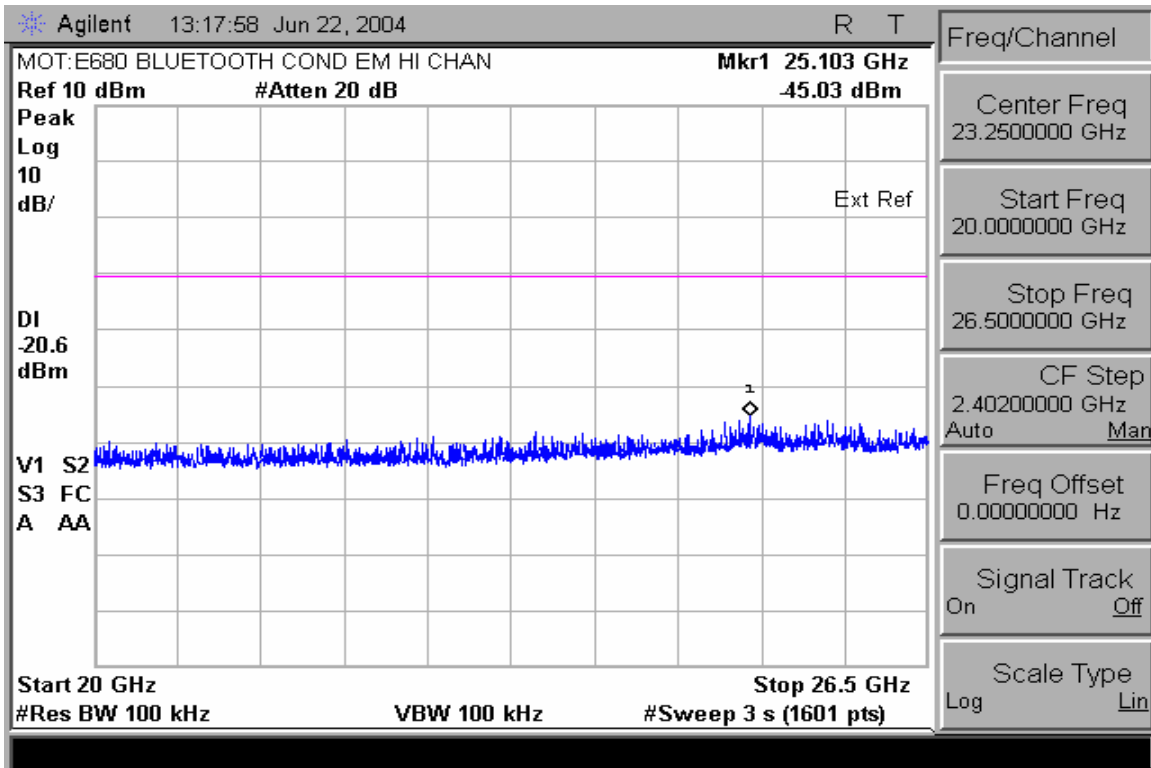
Conducted Spurious Emissions 30-3000MHz (High Channel Enabled)



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