MOTOROLA

MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT - Addendum

Test Report Number – 17164-1BT

Report Date – November 15, 2005

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 : 2005-22-09

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

A2LA Certificate Number: 1651.01

ACCREDITED

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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
Model Number:	L6
Version:	AAUG1906AA
Serial Numbers:	G0LT02004D, G0LT02003N
Testing Complete Date:	September 16, 2005

Applicable Standards

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

__X__Part 15 Subpart C – Intentional Radiators
_____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	Result
2	Number of Hopping Frequencies	Result
3	Time of Occupancy (Dwell Time)	Result
4	20 dB Bandwidth	Result
5	Spurious RF Conducted Emissions	Result
6	Field Strength of Spurious Emissions	Result
7	Max Power	N/A
8	Band Edges	See plots
9	Conducted Spurious Emissions	Result

Test	Test Name	Results
1	Carrier Frequency Separation	1 MHz
2	Number of Hopping	79
3	Time of Occupancy (Dwell Time)	2.93 ms
4	20 dB Bandwidth	858 kHz
5	Spurious RF Conducted Emissions	See plots
6	Field Strength of Spurious Emissions	See plots
7	Max Power	3.65 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 22º 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

Paste Equipment List Here

Manufacturer	Equipment Type	Model No.	Serial Number	Cal. Due Date
Rohde & Schwarz	Receiver	ESI26	838786/010	2/7/2006
Hewlett-Packard	EMC Analyzer	8593EM	3536A00118	10/2/2005
Hewlett-Packard	EMC Analyzer	7405	US39440191	11/13/2005
ETS	DRG Horn Antenna	265	2455	5/25/2006
ETS	DRG Horn Antenna	3115	6222	2/9/2006
ETS	Log-Periodic Antenna	3148	1188	6/14/2006
ETS	Biconical Antenna	3110B	3370	2/16/2006
Attenuator	Weinschel	AS-6	6675	10/14/2005
Attenuator	Weinschel	AS-6	6677	11/4/2005
Rohde & Schwarz	Mobile Test Set	CMD 80	DE29008	N/A
Hewlett-Packard	Signal Generator	83623B	3844A01195	5/23/2006
Thermotron	Environmental Chamber	S-4	31580	1/18/2006
Giga-Tronics	Power Meter	8651A	8650508	12/27/2005
U.L. Equipment				
Hewlett Packard	QP Adapter	85650A	2811A01069	1/6/2006
Hewlett Packard	S/A Display	8566B	2542A12974	1/6/2006
Hewlett Packard	S/A	8566B	2637A03376	1/6/2006
Hewlett Packard	RF Preselector	85685A	2810A00692	1/6/2006
Rohde & Schwarz	S/A	FSEK20	DE2525315	3/15/2006
EMCO	Horn Antenna 1-18GHz	3115	2638	7/29/2006
EMCO	Horn Antennas 18-26.5GHz	3160-09	9904-1165	N/A*
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	7/22/2006
Chase	Log-Periodic Antenna	UPA6108	1120	8/2/2006

All equipment is on a one-year calibration cycle.

Description of Bluetooth Transmitter

The L6 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.

The maximum Bluetooth antenna gain is 2.6 dBi.

Measurement Procedures and Data

CARRIER FREQUENCY SEPARATION

CFR 47 Part 15.247

Measurement Procedure

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

The Bluetooth transmitter of the L6 had its hopping function enabled. The following spectrum analyzer settings were used:

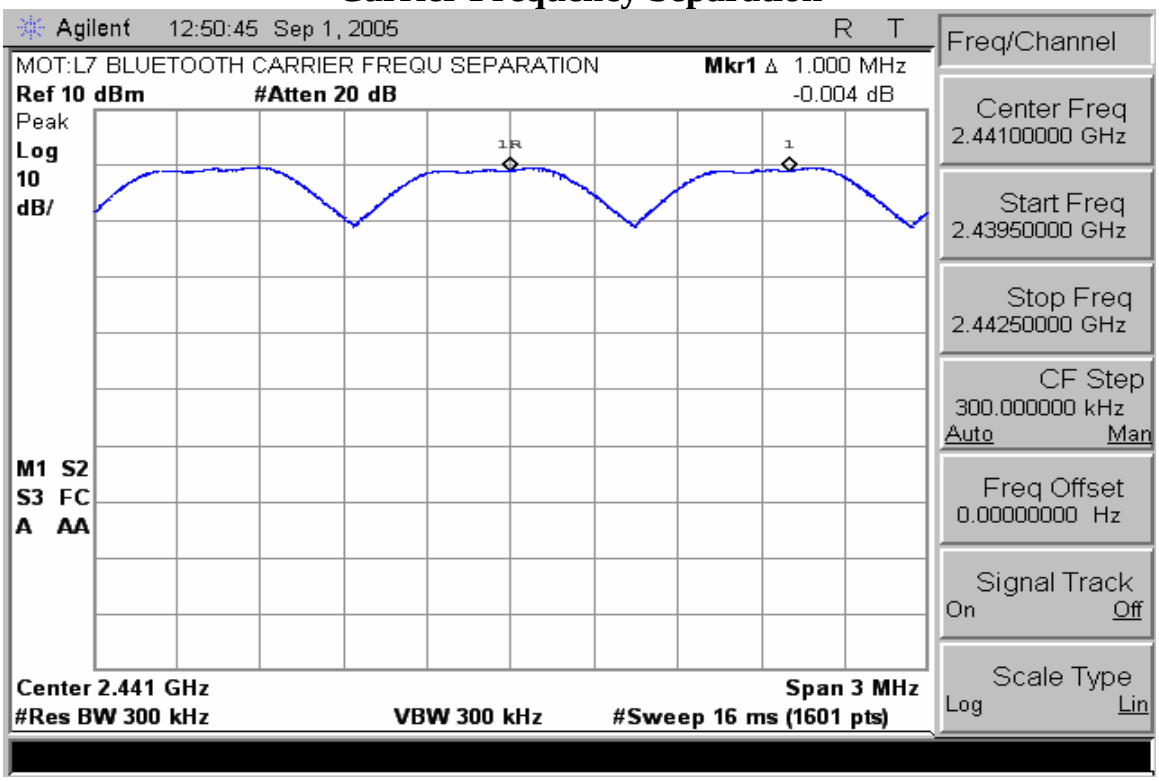
1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
3. Video (or Average) Bandwidth (VBW) ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

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.

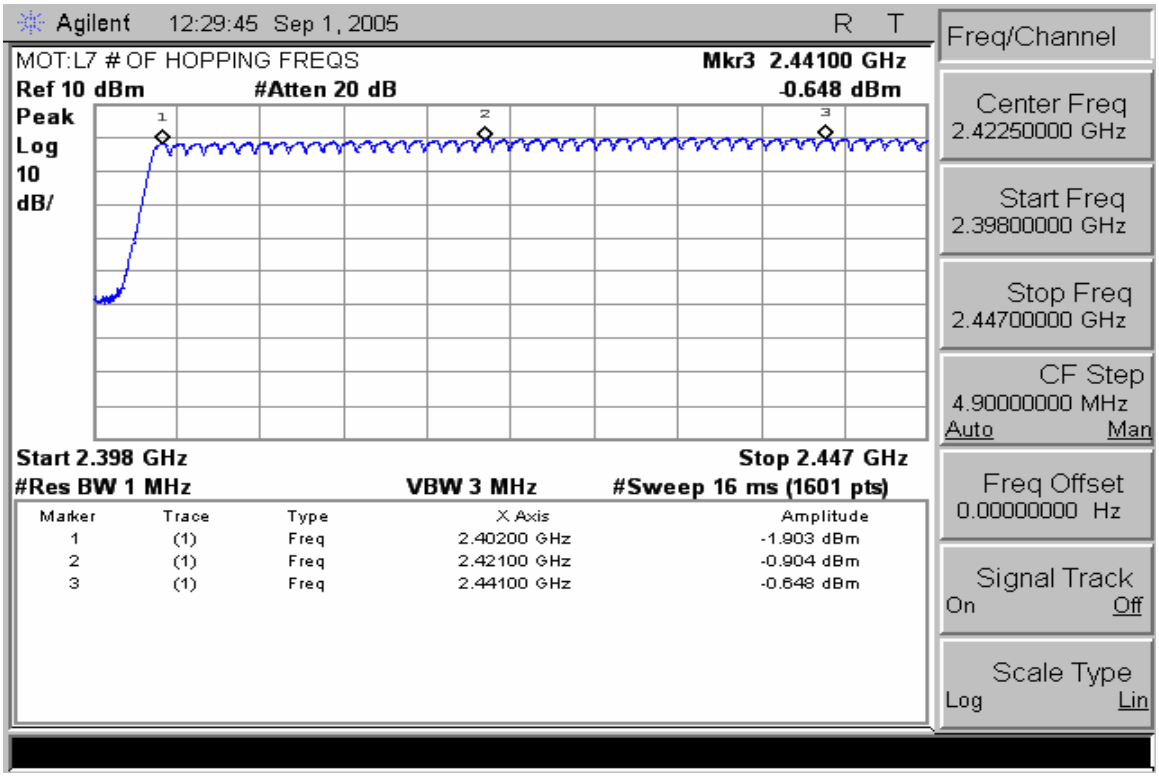
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

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

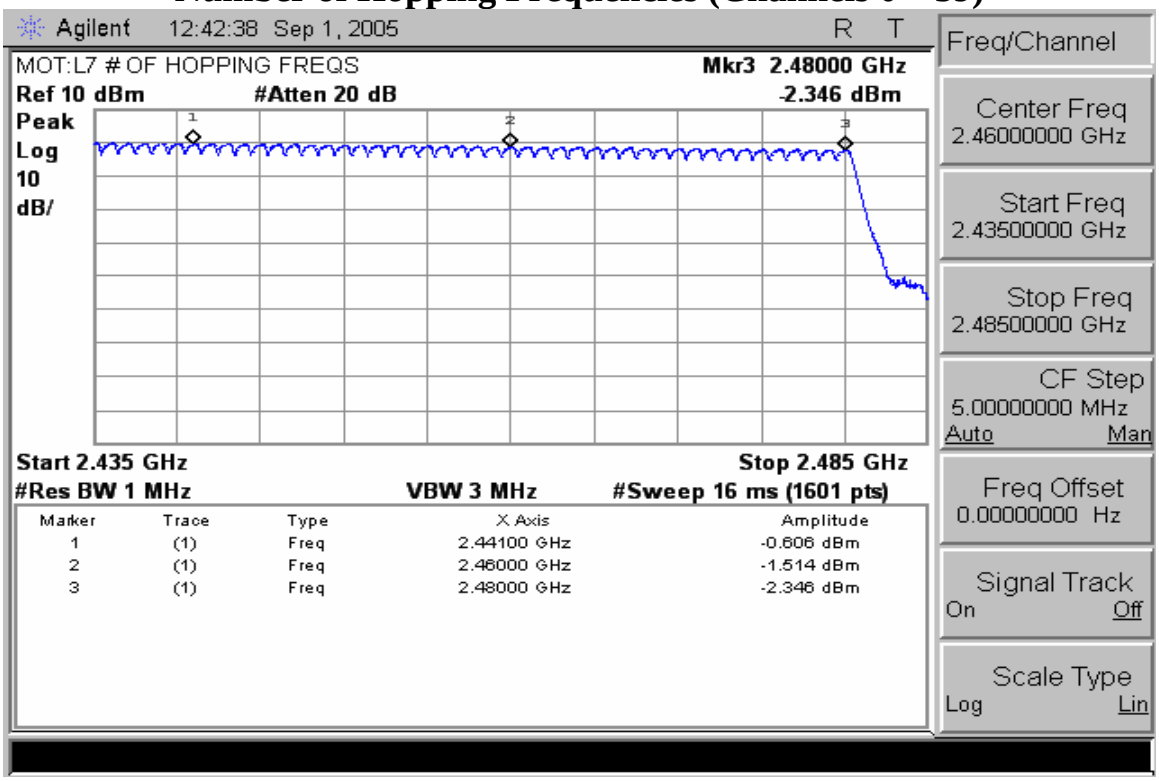
The trace was allowed to stabilize.

Measurement Results

See attached.



Number of Hopping Frequencies (Channels 0 – 39)



Number of Hopping Frequencies (Channels 39 – 78)

TIME OF OCCUPANCY (DWELL TIME)

CFR47 Part 15.247

Measurement Procedure

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

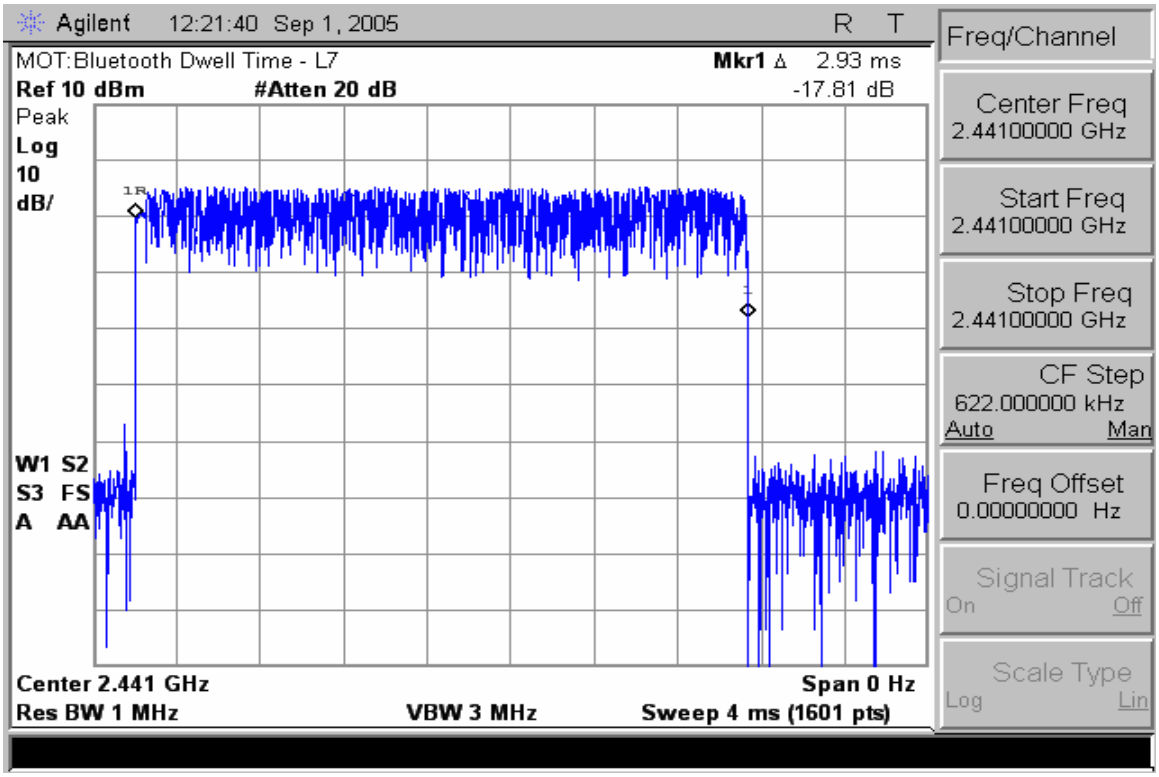
The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW ≥ 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


Agilent 12:21:40 Sep 1, 2005
R T
MOT:Bluetooth Dwell Time - L7
Mkr1 Δ 2.93 ms
Ref 10 dBm
#Atten 20 dB
-17.81 dB
Peak
Log
10
dB/
W1 S2
S3 FS
A AA
Center 2.441 GHz
Span 0 Hz
Res BW 1 MHz
VBW 3 MHz
Sweep 4 ms (1601 pts)
Freq/Channel
Center Freq
2.44100000 GHz
Start Freq
2.44100000 GHz
Stop Freq
2.44100000 GHz
CF Step
622.000000 kHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Scale Type
Log
Lin

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.

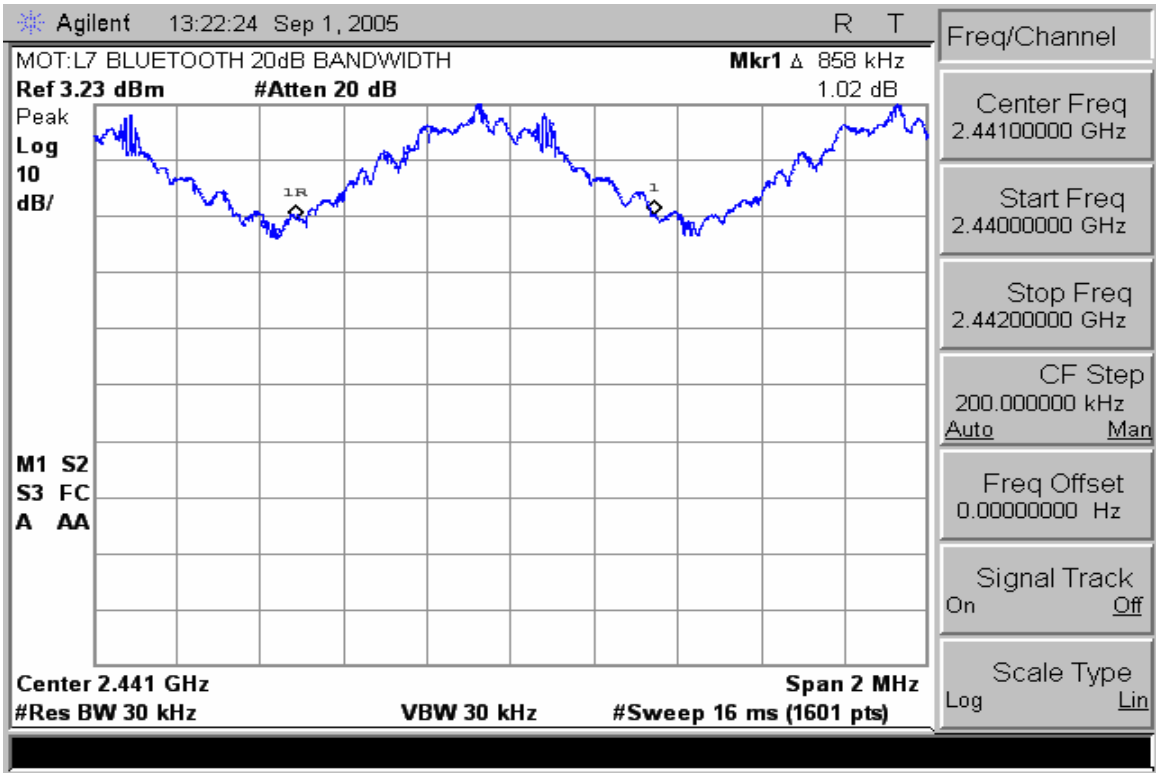
The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20dB bandwidth, centered on a hopping frequency
2. RBW ≥ 1% of the 20dB span
3. VBW ≥ 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



20dB Bandwidth

FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 15.247

Measurement Procedure

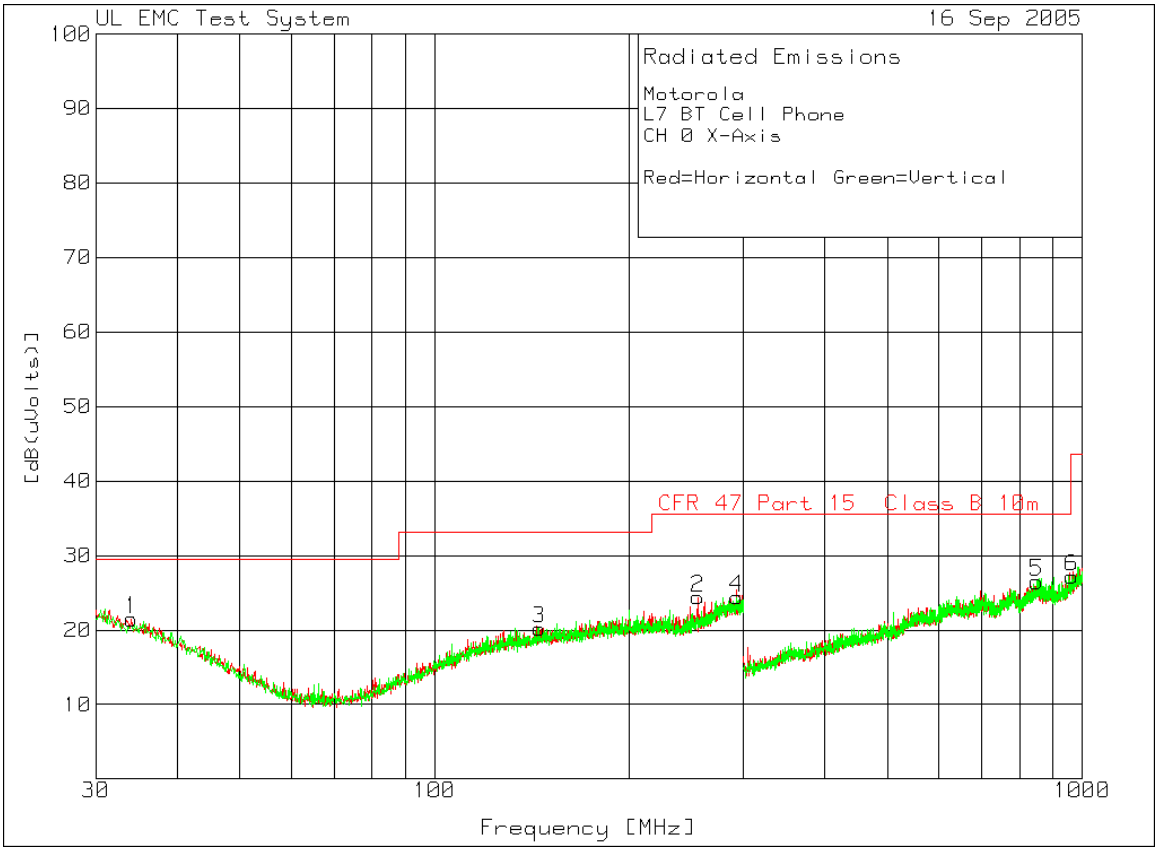
The Equipment-Under-Test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is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

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.

Measurement Results

Attached

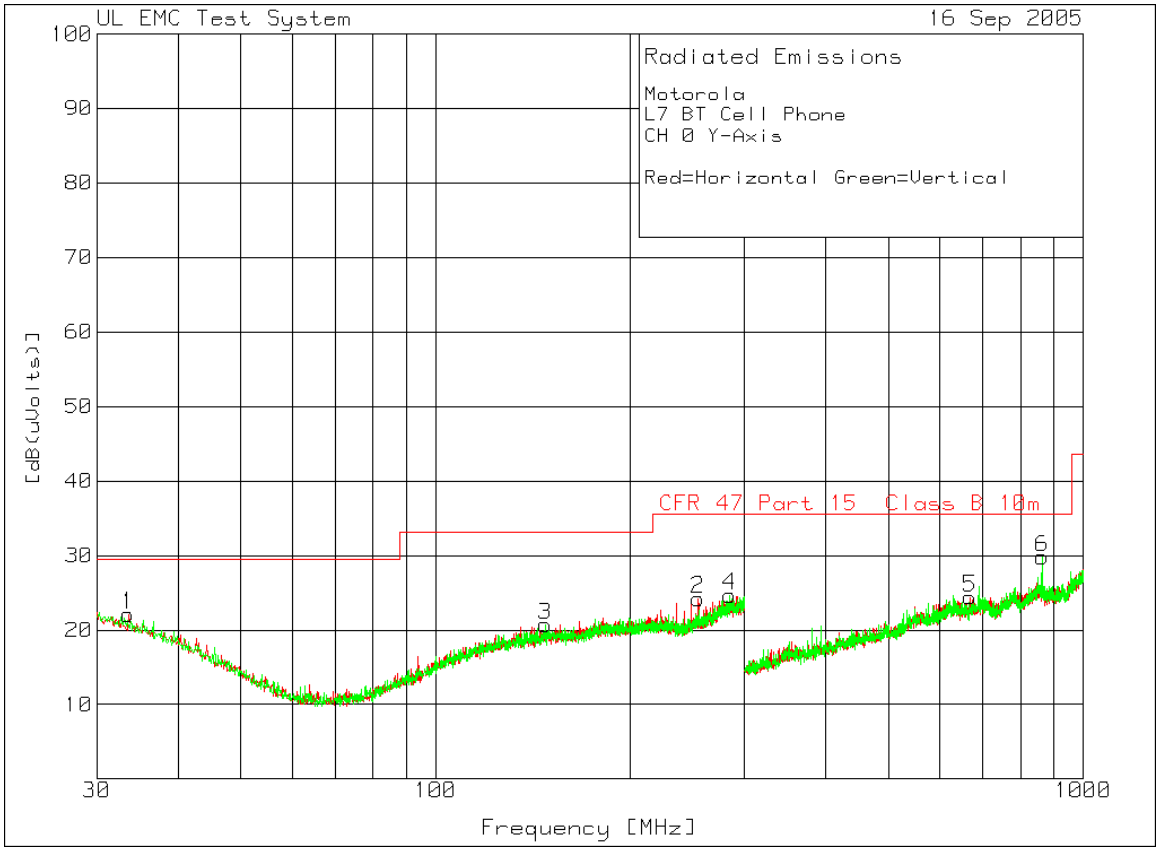


30-1000MHz Low Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 0 X-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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	34.048	35.4	pk	-30.4	16.5	21.5	29.6	-8.1	70	100	Horz
2	254.6626	37.5	pk	-29.5	16.4	24.4	35.6	-11.2	70	100	Horz
Range 2 30 - 300MHz											
3	145.0974	35.7	pk	-30.1	14.6	20.2	33.1	-12.9	185	100	Vert
4	292.8485	35.6	pk	-29.3	18.1	24.4	35.6	-11.2	300	100	Vert
Range 3 300 - 1000MHz											
5	850.6247	35.2	pk	-31.5	22.8	26.5	35.6	-9.1	41	100	Horz
Range 4 300 - 1000MHz											
6	963.2684	35.2	pk	-31.3	23.3	27.2	43.5	-16.3	185	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

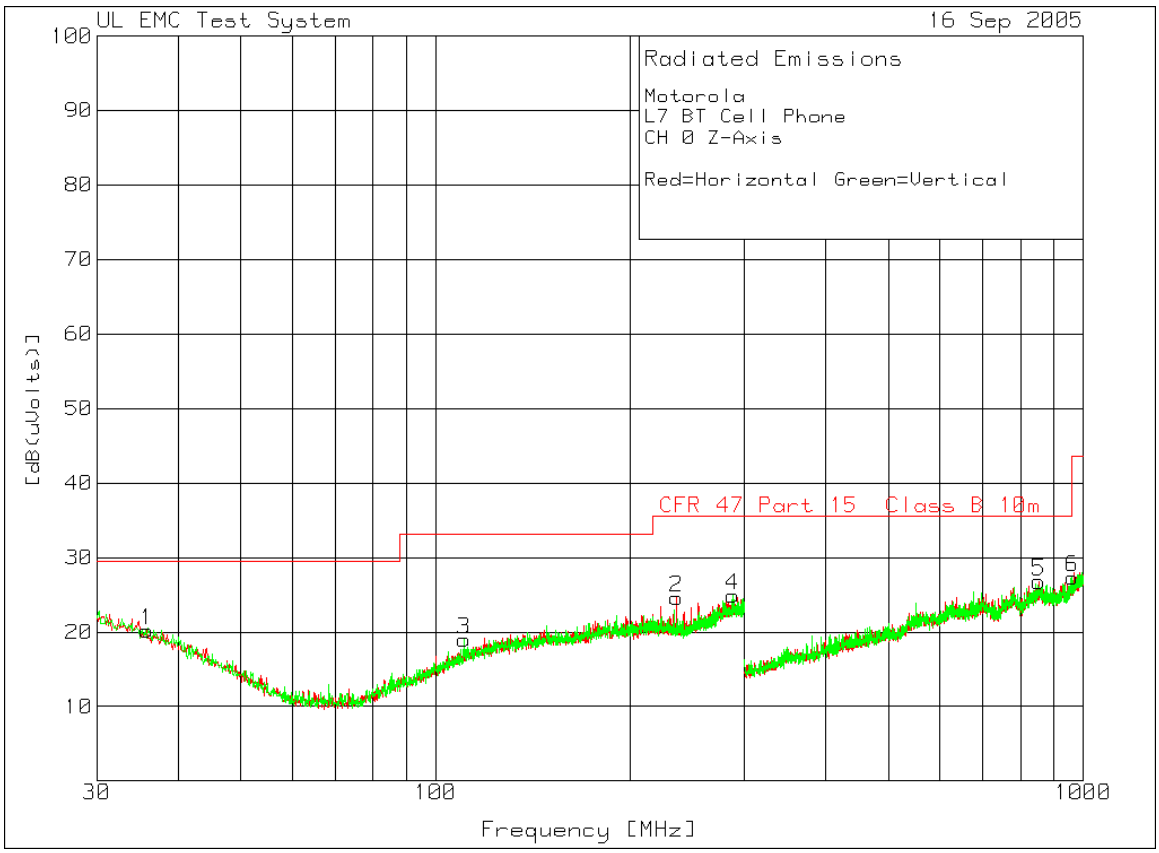


30-1000MHz Low Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 0 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	33.5082	35.8	pk	-30.4	16.7	22.1	29.6	-7.5	9	100	Horz
2	254.5277	37.3	pk	-29.5	16.4	24.2	35.6	-11.4	99	100	Horz
Range 2 30 - 300MHz											
3	147.6611	36	pk	-30	14.7	20.7	33.1	-12.4	70	100	Vert
4	284.3478	35.9	pk	-29.2	18	24.7	35.6	-10.9	214	100	Vert
Range 3 300 - 1000MHz											
5	667.6662	35.3	pk	-30.9	20	24.4	35.6	-11.2	328	100	Horz
Range 4 300 - 1000MHz											
6	863.2184	38.7	pk	-31.5	22.6	29.8	35.6	-5.8	98	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

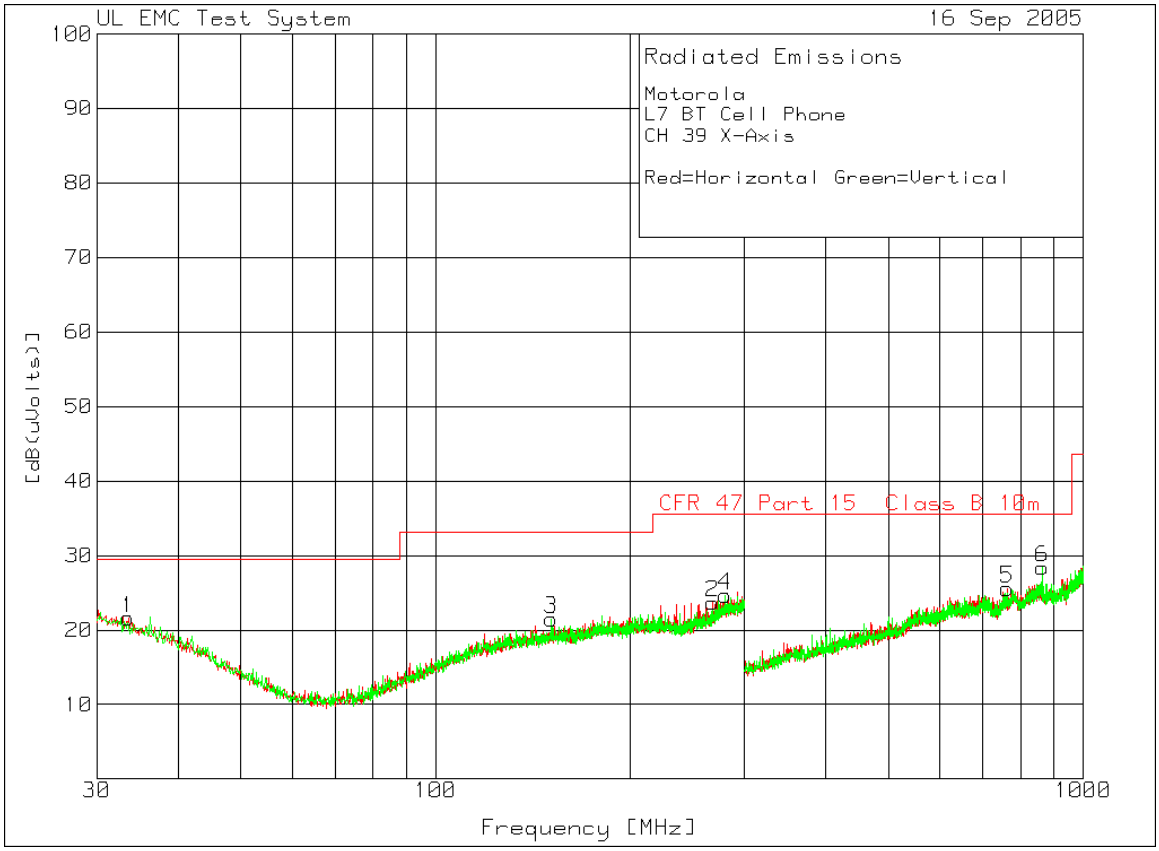


30-1000MHz Low Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 0 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	35.8021	34.5	pk	-30.3	16	20.2	29.6	-9.4	99	100	Horz
2	235.5022	38.8	pk	-29.7	15.5	24.6	35.6	-11	358	100	Horz
Range 2 30 - 300MHz											
3	110.5547	36.7	pk	-30	12.3	19	33.1	-14.1	359	100	Vert
4	287.5861	36	pk	-29.3	18.2	24.9	35.6	-10.7	10	100	Vert
Range 3 300 - 1000MHz											
5	854.123	35.3	pk	-31.5	23	26.8	35.6	-8.8	70	100	Horz
Range 4 300 - 1000MHz											
6	961.8691	35.3	pk	-31.3	23.3	27.3	43.5	-16.2	156	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

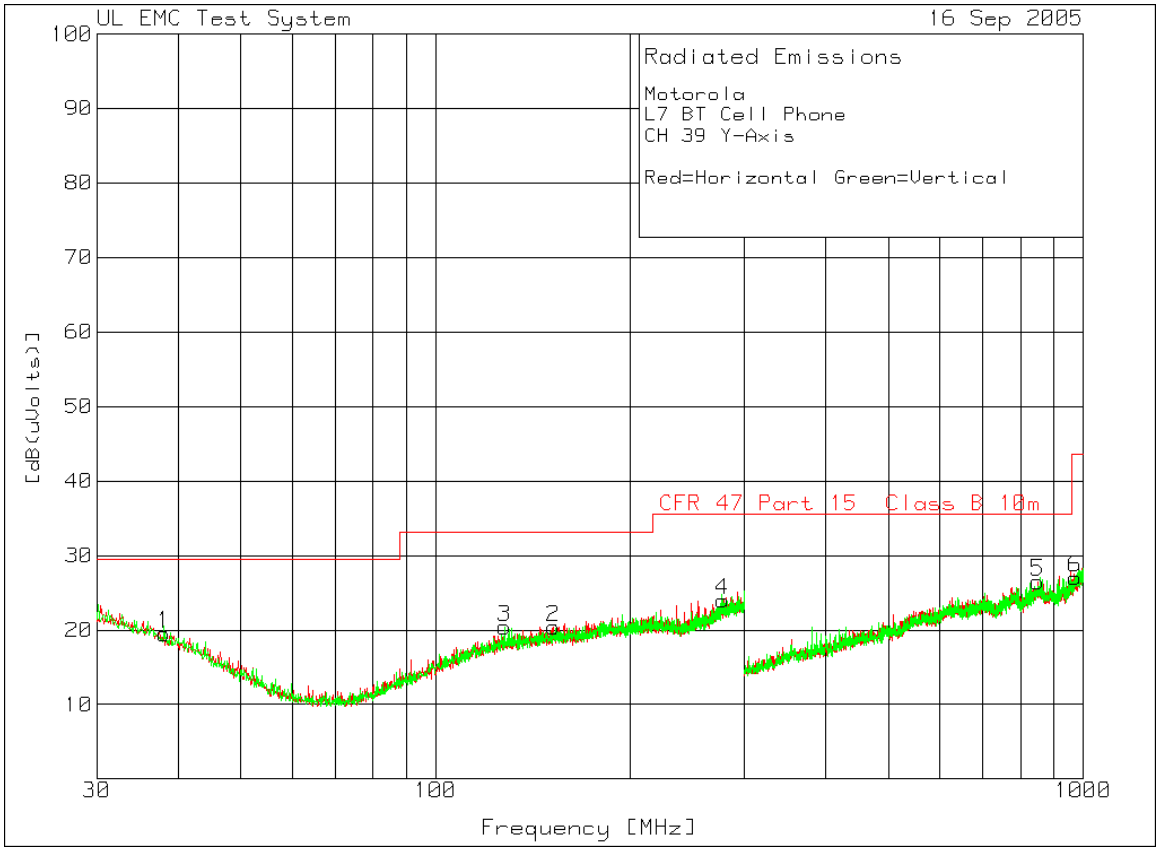


30-1000MHz Mid Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 39 X-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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	33.5082	35.3	pk	-30.4	16.7	21.6	29.6	-8	156	100	Horz
2	267.3463	36.3	pk	-29.4	16.8	23.7	35.6	-11.9	9	100	Horz
Range 2 30 - 300MHz											
3	150.8995	36.8	pk	-30.1	14.8	21.5	33.1	-11.6	358	100	Vert
4	280.1649	36.1	pk	-29.3	17.9	24.7	35.6	-10.9	272	100	Vert
Range 3 300 - 1000MHz											
5	763.5183	35.5	pk	-31	21.1	25.6	35.6	-10	10	100	Horz
Range 4 300 - 1000MHz											
6	863.2184	37.3	pk	-31.5	22.6	28.4	35.6	-7.2	242	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

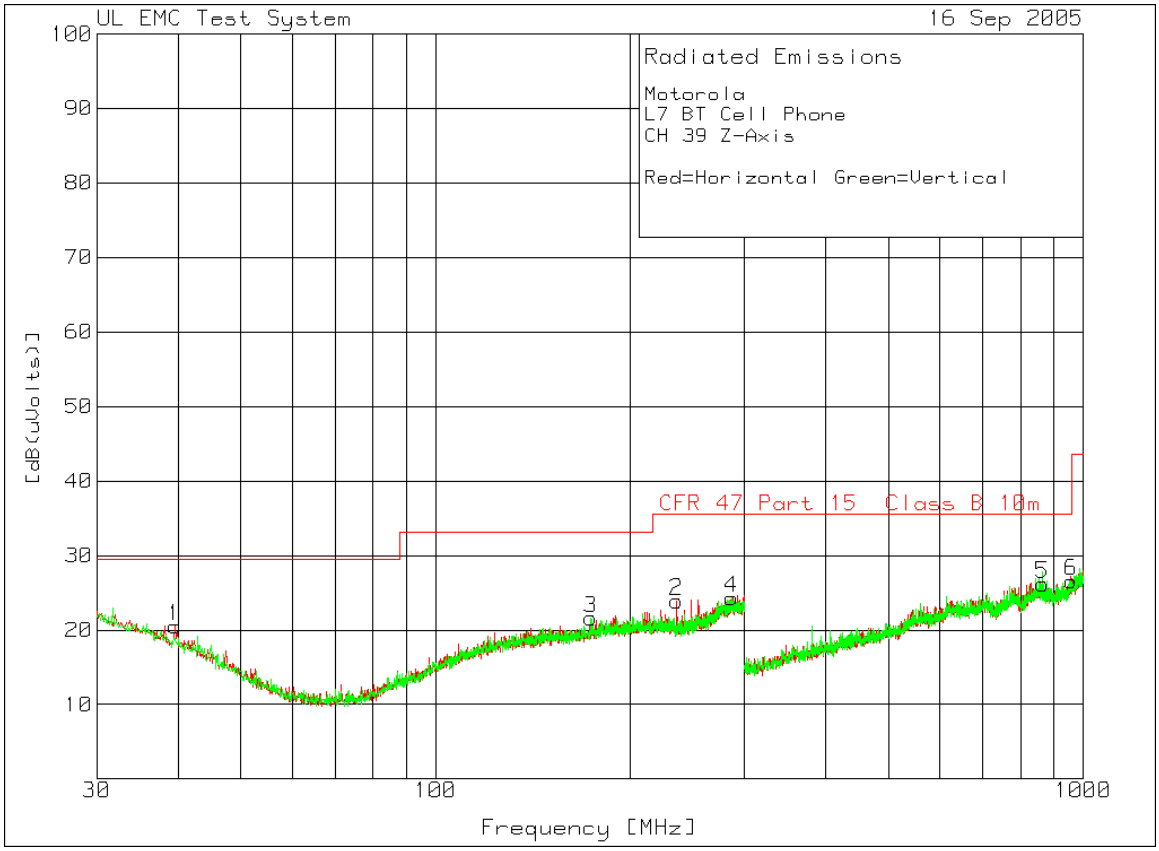


30 -1000MHz Mid Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 39 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	38.096	34.8	pk	-30.4	15.1	19.5	29.6	-10.1	99	100	Horz
2	152.1139	35.6	pk	-30.1	14.9	20.4	33.1	-12.7	243	100	Horz
Range 2 30 - 300MHz											
3	127.6911	36.6	pk	-30.1	13.9	20.4	33.1	-12.7	70	100	Vert
4	277.4662	35.4	pk	-29.3	17.9	24	35.6	-11.6	128	100	Vert
Range 3 300 - 1000MHz											
5	849.9251	35.2	pk	-31.5	22.8	26.5	35.6	-9.1	156	100	Horz
Range 4 300 - 1000MHz											
6	970.9645	34.7	pk	-31.1	23.4	27	43.5	-16.5	300	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

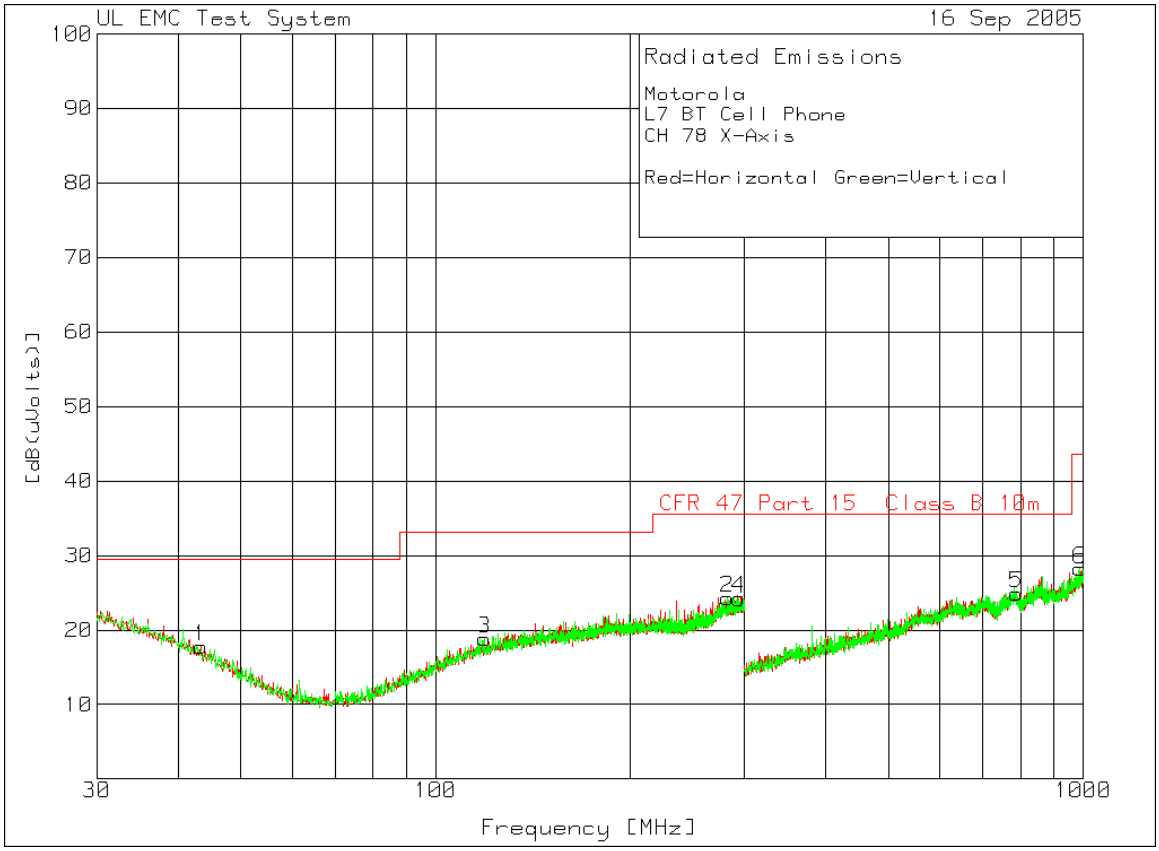


30 -1000MHz Mid Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 39 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	39.5802	36.4	pk	-30.4	14.5	20.5	29.6	-9.1	12	100	Horz
2	235.5022	38.1	pk	-29.7	15.5	23.9	35.6	-11.7	214	100	Horz
Range 2 30 - 300MHz											
3	173.7031	36.3	pk	-30	15.3	21.6	33.1	-11.5	329	100	Vert
4	286.3718	35.6	pk	-29.4	18.1	24.3	35.6	-11.3	214	100	Vert
Range 3 300 - 1000MHz											
5	866.3668	35.3	pk	-31.5	22.4	26.2	35.6	-9.4	329	100	Horz
Range 4 300 - 1000MHz											
6	958.021	34.6	pk	-31.3	23.3	26.6	35.6	-9	40	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

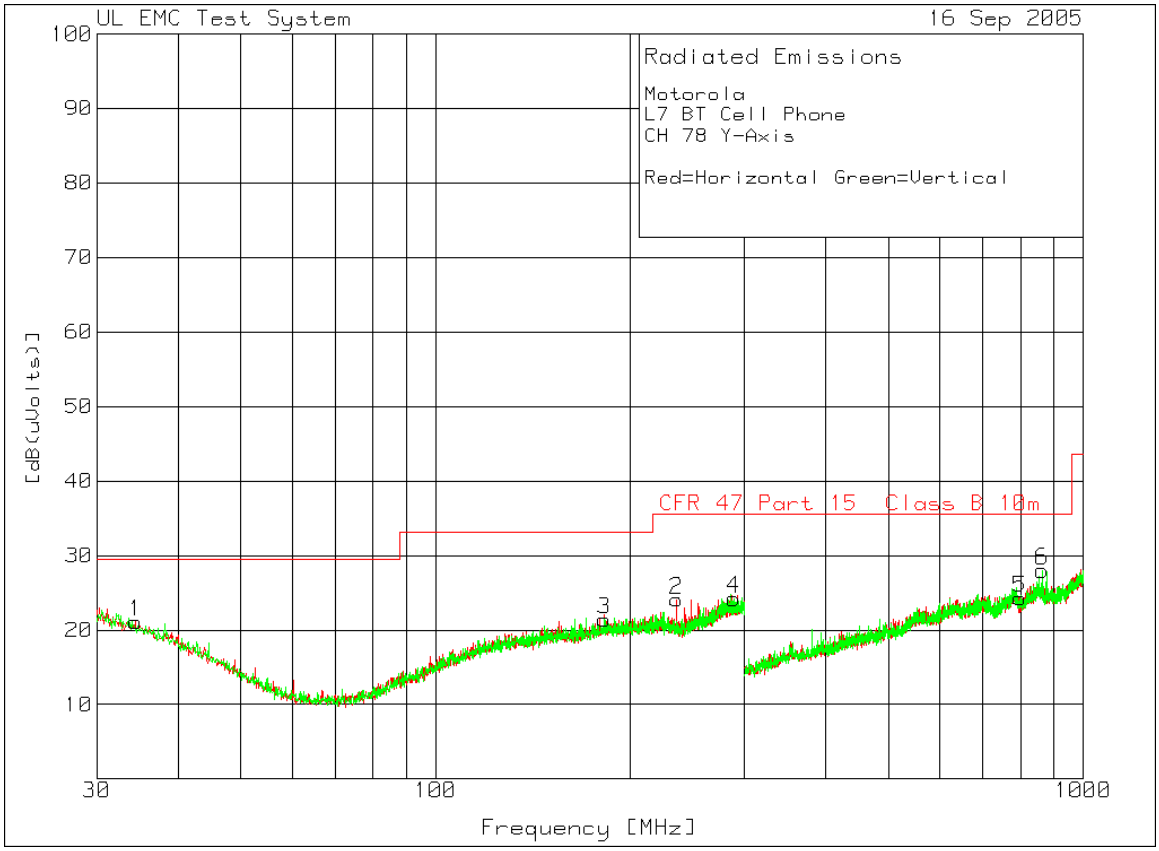


30 -1000MHz High Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 78 X-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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	43.3583	35.1	pk	-30.3	13	17.8	29.6	-11.8	70	100	Horz
2	282.3238	35.6	pk	-29.3	18	24.3	35.6	-11.3	0	100	Horz
Range 2 30 - 300MHz											
3	119.0555	35.6	pk	-30	13.2	18.8	33.1	-14.3	272	100	Vert
4	293.793	35.3	pk	-29.2	18.1	24.2	35.6	-11.4	99	100	Vert
Range 3 300 - 1000MHz											
5	788.3558	34.5	pk	-31.2	21.6	24.9	35.6	-10.7	357	100	Horz
Range 4 300 - 1000MHz											
6	988.4558	35.1	pk	-30.7	23.8	28.2	43.5	-15.3	359	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

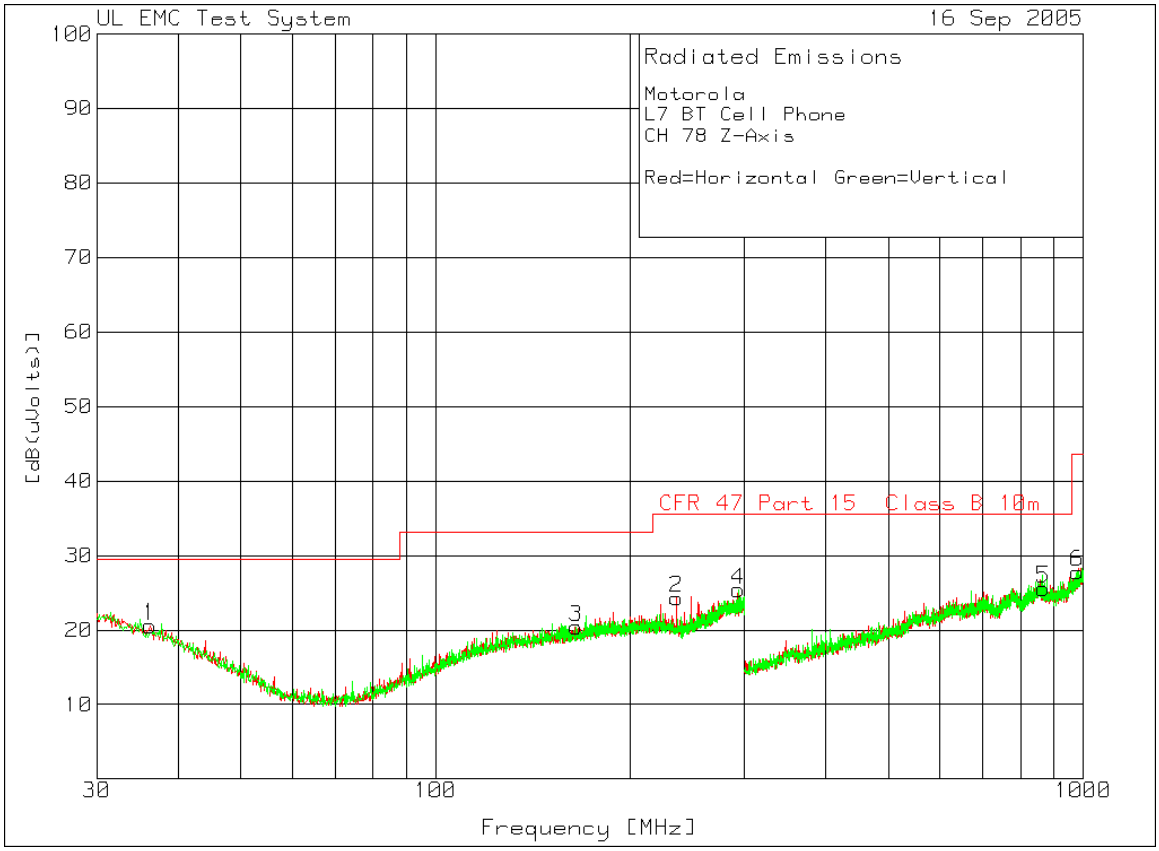


30 -1000MHz High Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 78 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	34.4528	35	pk	-30.4	16.5	21.1	29.6	-8.5	10	100	Horz
2	235.5022	38.3	pk	-29.7	15.5	24.1	35.6	-11.5	271	100	Horz
Range 2 30 - 300MHz											
3	182.2039	35.6	pk	-30	15.8	21.4	33.1	-11.7	69	100	Vert
4	288.6656	35.4	pk	-29.3	18.1	24.2	35.6	-11.4	300	100	Vert
Range 3 300 - 1000MHz											
5	799.5502	34.7	pk	-31.3	20.9	24.3	35.6	-11.3	69	100	Horz
Range 4 300 - 1000MHz											
6	863.2184	36.9	pk	-31.5	22.6	28	35.6	-7.6	185	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

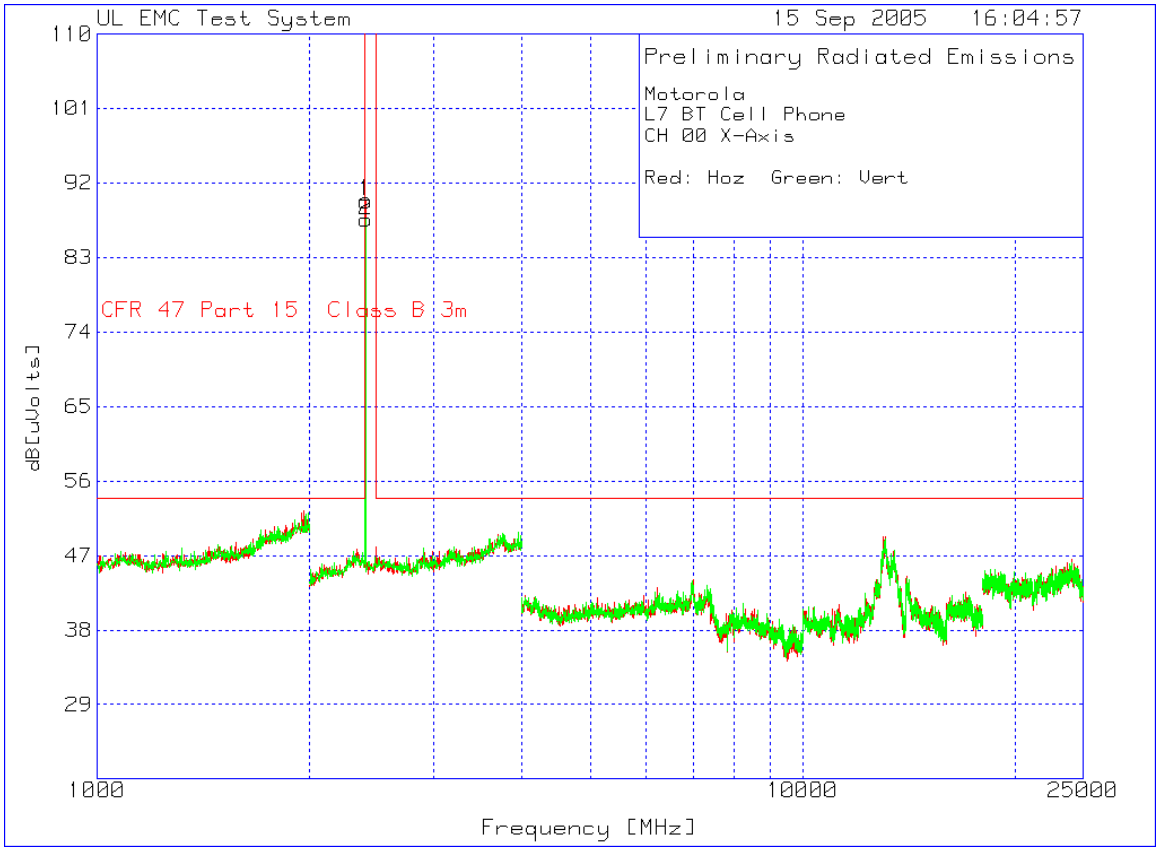


30 -1000MHz High Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 78 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)]	Limit 1	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity
Range 1 30 - 300MHz											
1	36.2069	35.1	pk	-30.3	15.8	20.6	29.6	-9	329	100	Horz
2	235.5022	38.5	pk	-29.7	15.5	24.3	35.6	-11.3	70	100	Horz
Range 2 30 - 300MHz											
3	164.7976	35.4	pk	-30	15	20.4	33.1	-12.7	358	100	Vert
4	293.1184	36.5	pk	-29.2	18.1	25.4	35.6	-10.2	156	100	Vert
Range 3 300 - 1000MHz											
5	867.4163	34.7	pk	-31.5	22.4	25.6	35.6	-10	271	100	Horz
Range 4 300 - 1000MHz											
6	978.3109	35.2	pk	-31	23.6	27.8	43.5	-15.7	300	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 10m

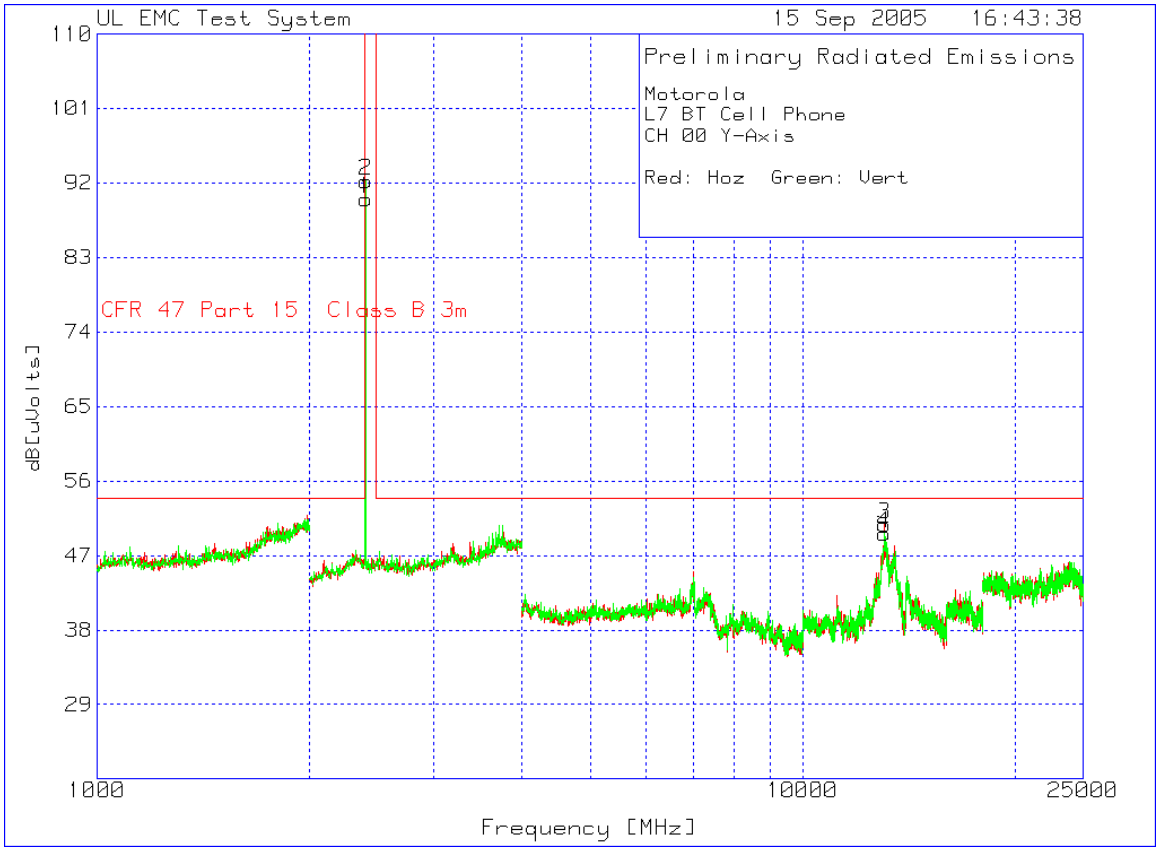


1-25 GHz Low Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 00 X-Axis
Red: Hoz Green: Vert

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	2400.802	63.58	pk	4.4	21.8	89.78	999	-909.22	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2400.802	61.36	pk	4.4	21.8	87.56	999	-911.44	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

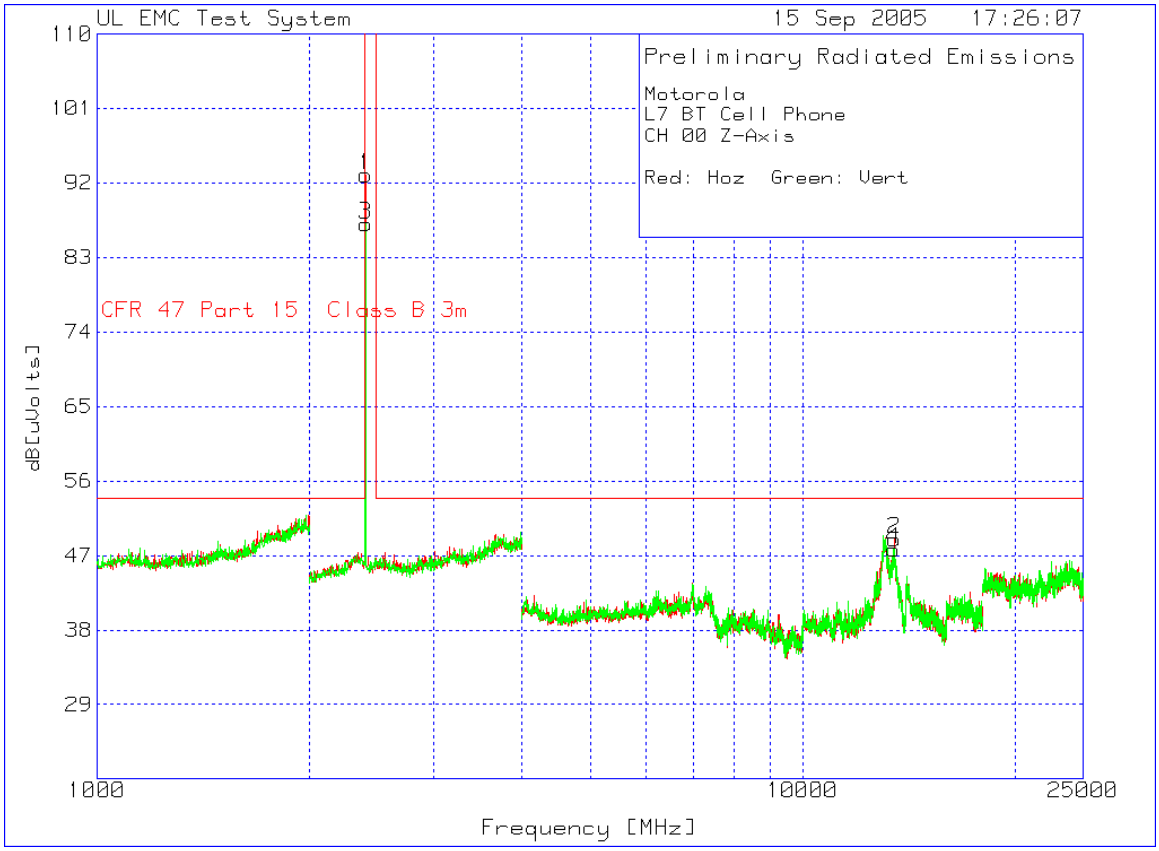


1-25 GHz Low Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 00 Y-Axis
Red: Hoz Green: Vert

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
2 - 4GHz 2000 - 4000MHz										
1	2400.802	63.82	pk	4.4	21.8	90.02	999	-908.98	100	Horz
12 - 18GHz 12000 - 18000MHz										
3	13064.71	45.06	pk	-34.1	39.8	50.76	54	-3.24	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2400.802	66.02	pk	4.4	21.8	92.22	999	-906.78	149	Vert
12 - 18GHz 12000 - 18000MHz										
4	13048.699	44.24	pk	-34.4	39.8	49.64	54	-4.36	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

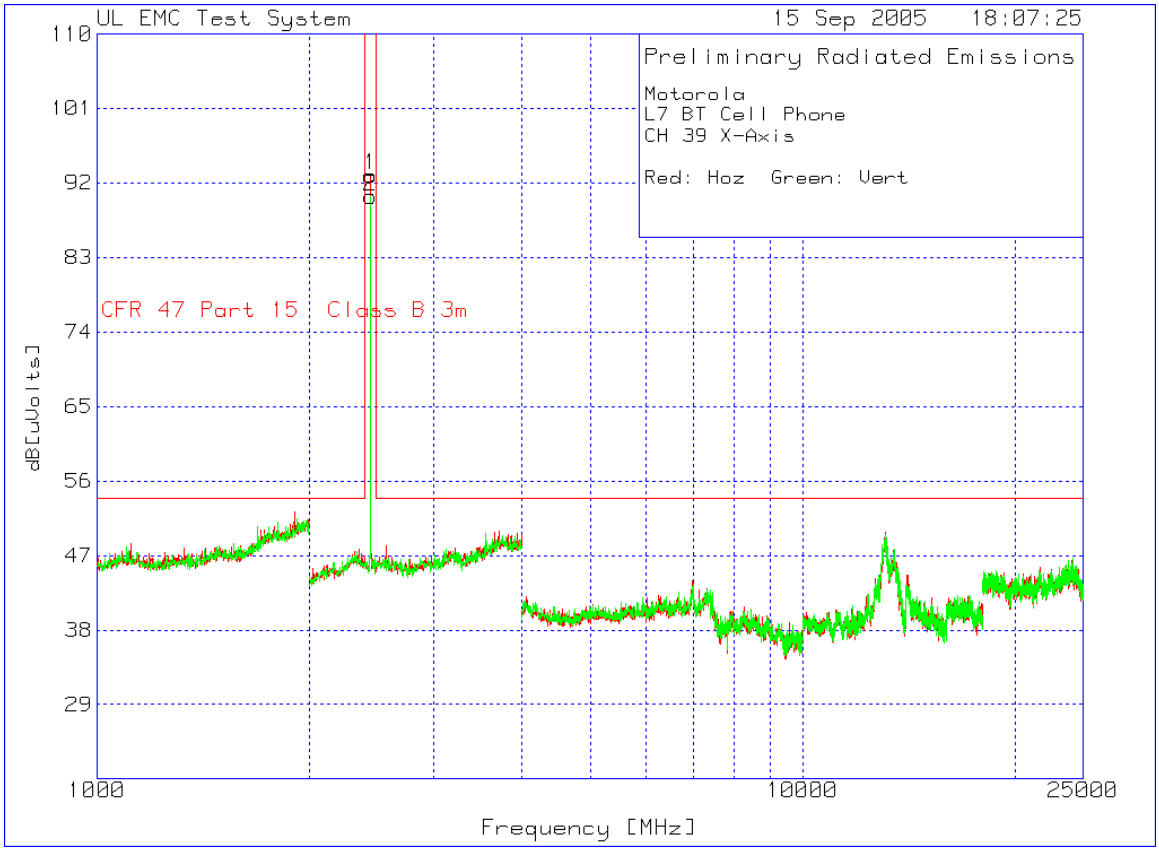


1-25 GHz Low Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 00 Z-Axis
Red: Hoz Green: Vert

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	2400.802	66.75	pk	4.4	21.8	92.95	999	-906.05	100	Horz
12 - 18GHz 12000 - 18000MHz										
2	13484.99	44.78	pk	-35.6	39.8	48.98	54	-5.02	100	Horz
2 - 4GHz 2000 - 4000MHz										
3	2400.802	60.81	pk	4.4	21.8	87.01	999	-911.99	149	Vert
12 - 18GHz 12000 - 18000MHz										
4	13460.974	43.24	pk	-35.3	39.8	47.74	54	-6.26	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

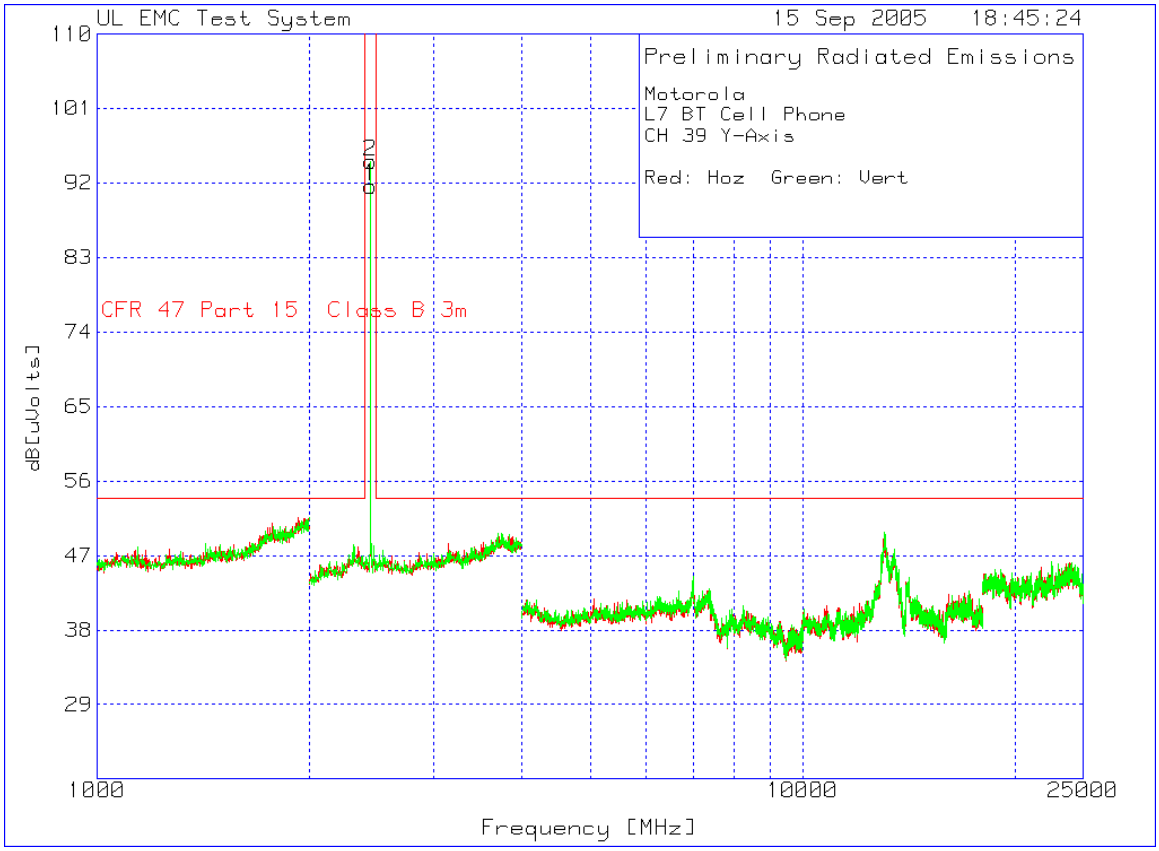


1-25 GHz Mid Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 39 X-Axis
Red: Hoz Green: Vert

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	66.81	pk	4.2	21.9	92.91	999	-906.09	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	64.27	pk	4.2	21.9	90.37	999	-908.63	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

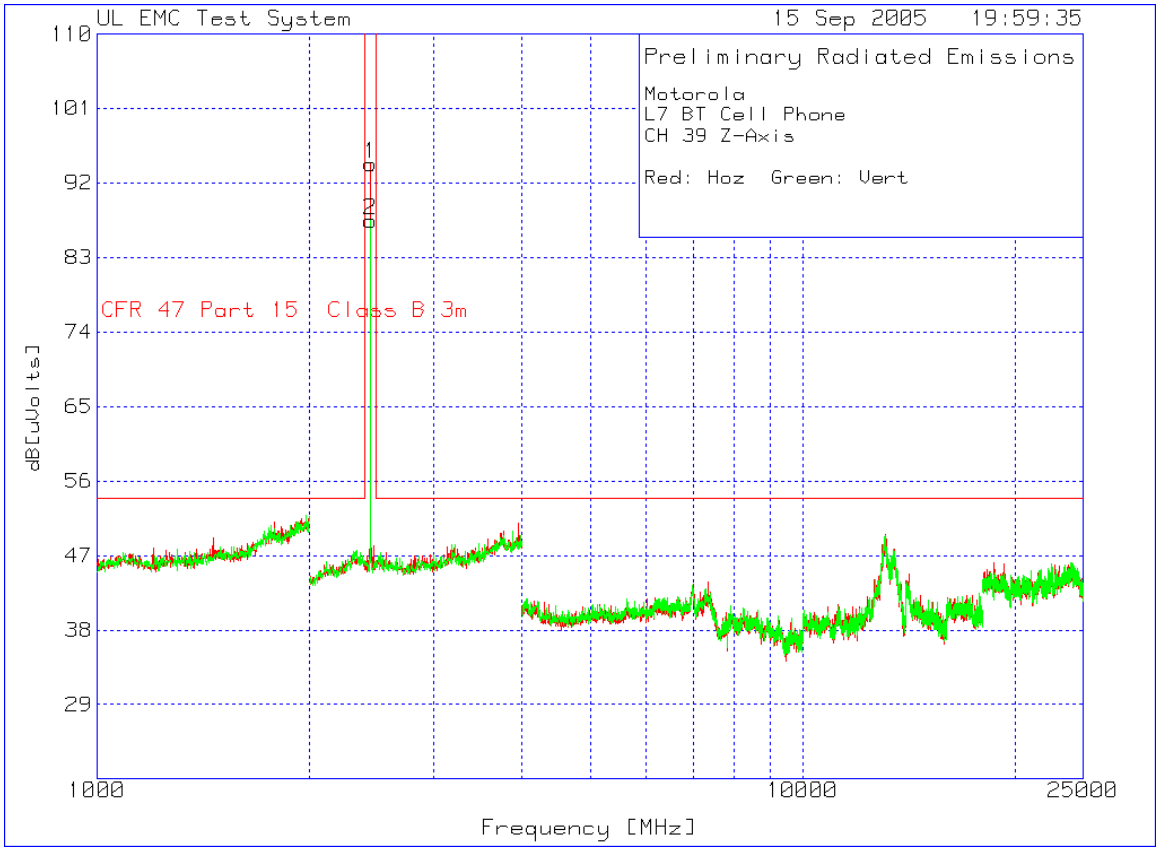


1-25 GHz Mid Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 39 Y-Axis
Red: Hoz Green: Vert

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
2 - 4GHz 2000 - 4000MHz										
1	2440.882	65.52	pk	4.2	21.9	91.62	999	-907.38	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	68.49	pk	4.2	21.9	94.59	999	-904.41	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

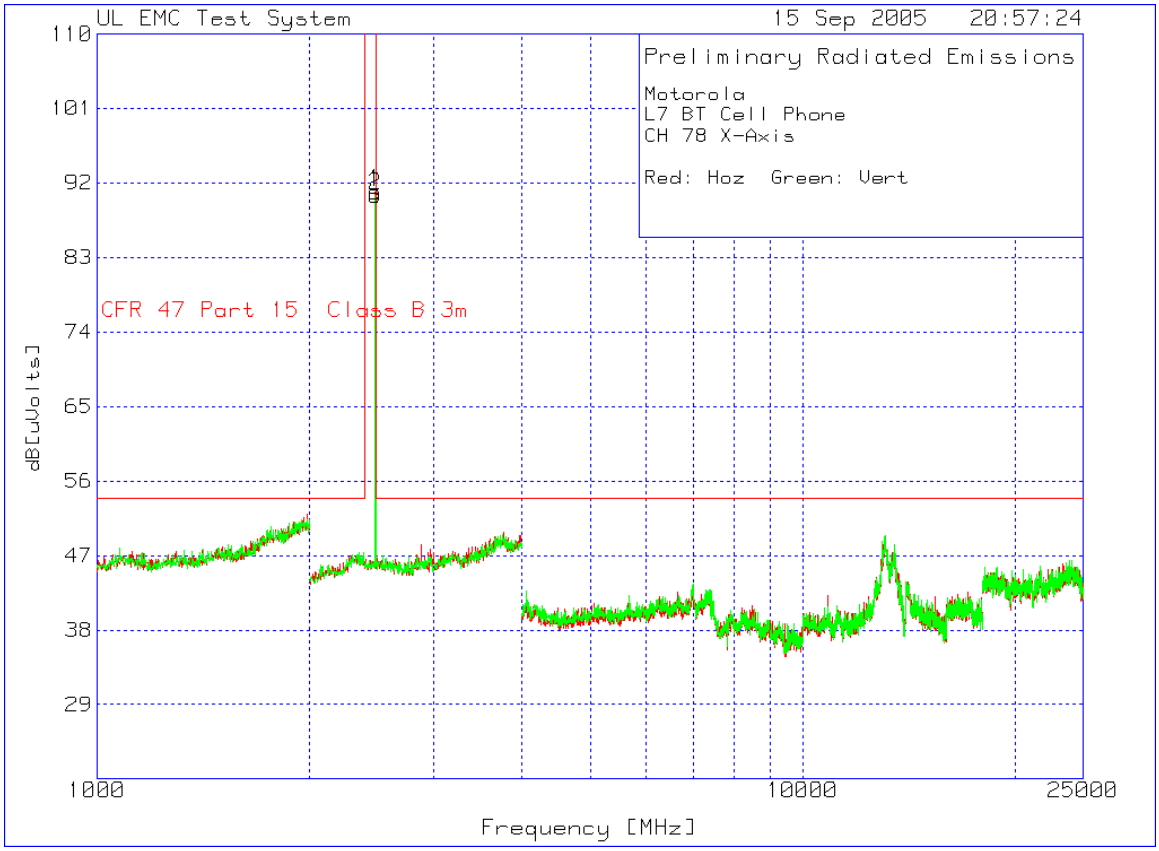


1-25 GHz Mid Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 39 Z-Axis
Red: Hoz Green: Vert

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	68.21	pk	4.2	21.9	94.31	999	-904.69	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2440.882	61.37	pk	4.2	21.9	87.47	999	-911.53	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

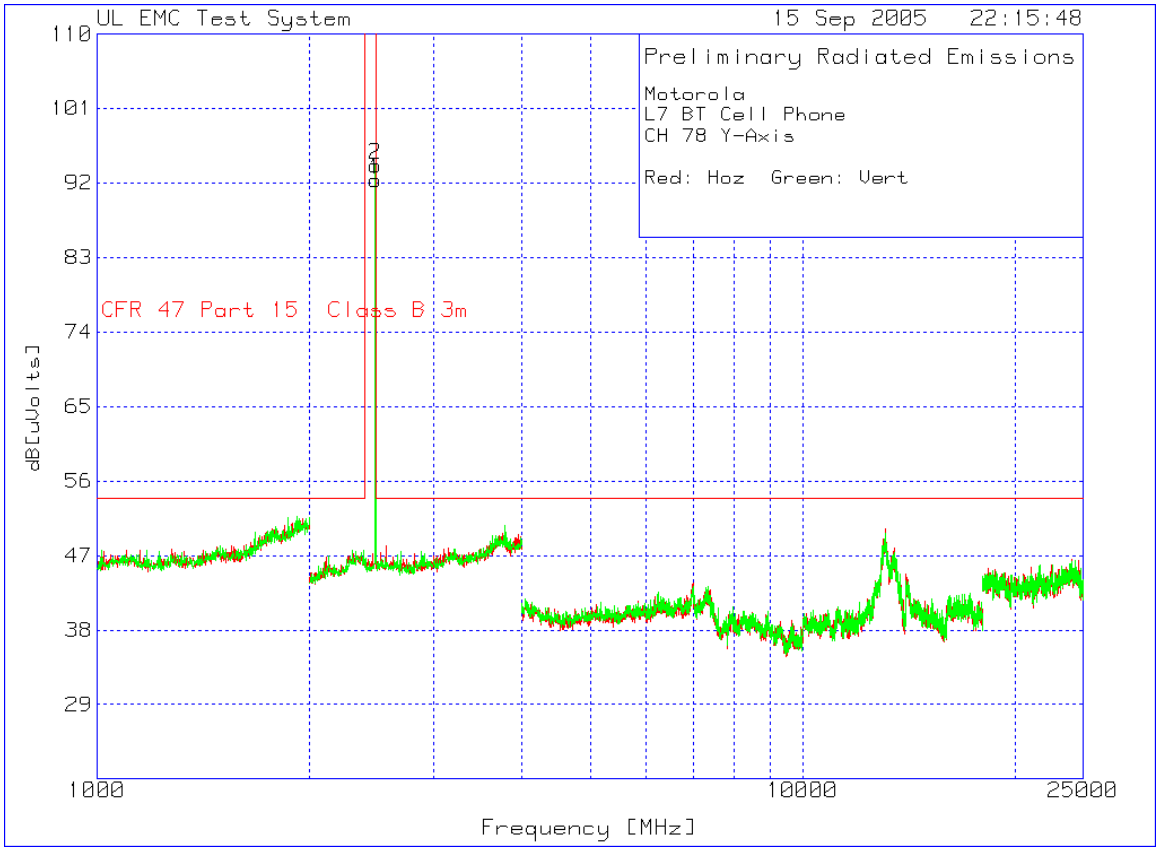


1-25 GHz High Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 78 X-Axis
Red: Hoz Green: Vert

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	64.83	pk	4.1	22	90.93	999	-908.07	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	64.43	pk	4.1	22	90.53	999	-908.47	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

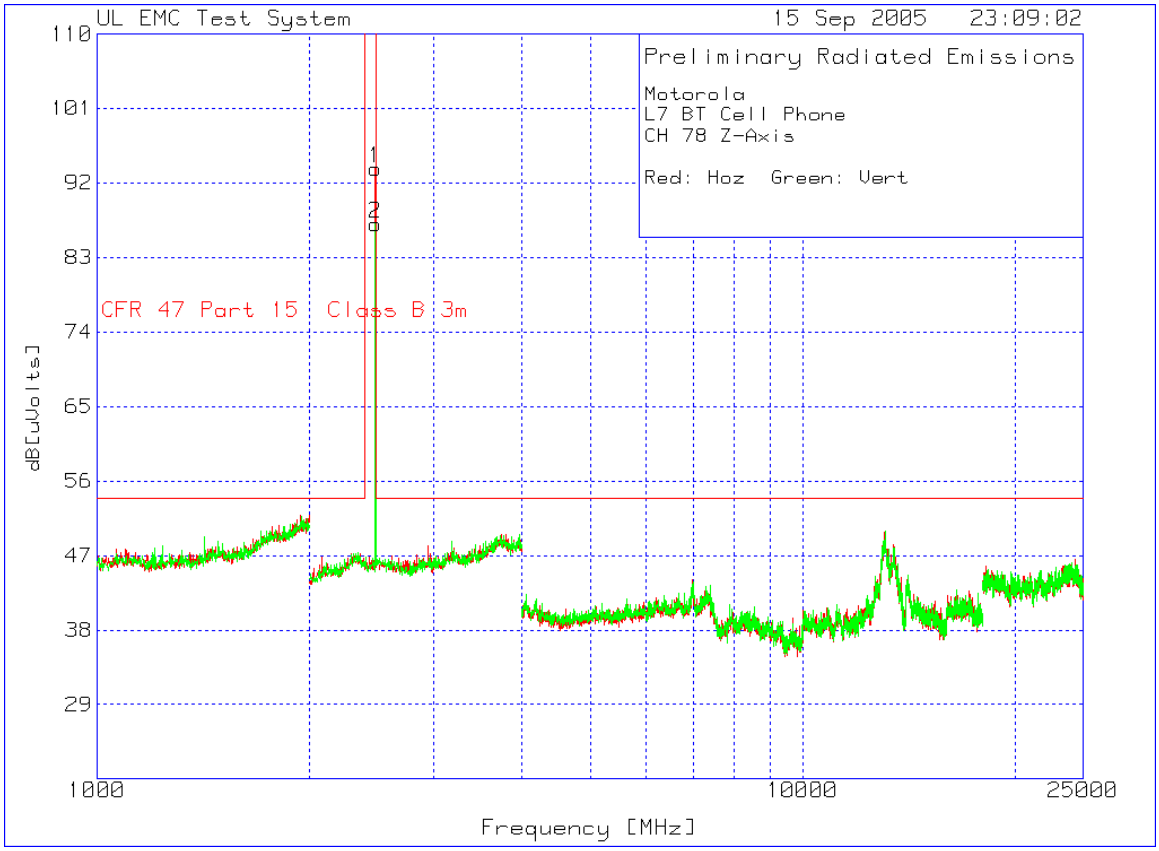


1-25 GHz High Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 78 Y-Axis
Red: Hoz Green: Vert

Marker Number	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts]	Limit 1	Margin 1[dB]	Height [cm]	Polarity
2 - 4GHz 2000 - 4000MHz										
1	2480.962	66.26	pk	4.1	22	92.36	999	-906.64	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	68.05	pk	4.1	22	94.15	999	-904.85	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

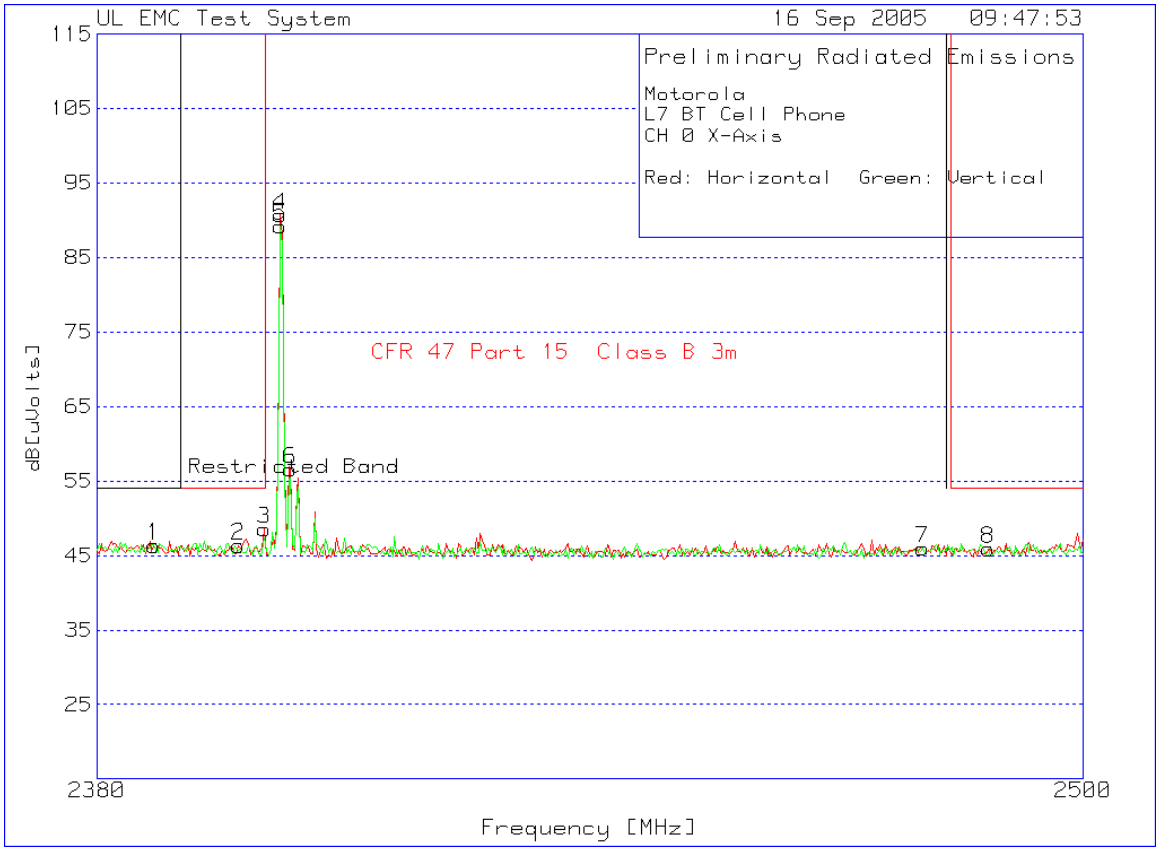


1-25 GHz High Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 78 Z-Axis
Red: Hoz Green: Vert

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	67.62	pk	4.1	22	93.72	999	-905.28	100	Horz
2 - 4GHz 2000 - 4000MHz										
2	2480.962	60.97	pk	4.1	22	87.07	999	-911.93	150	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

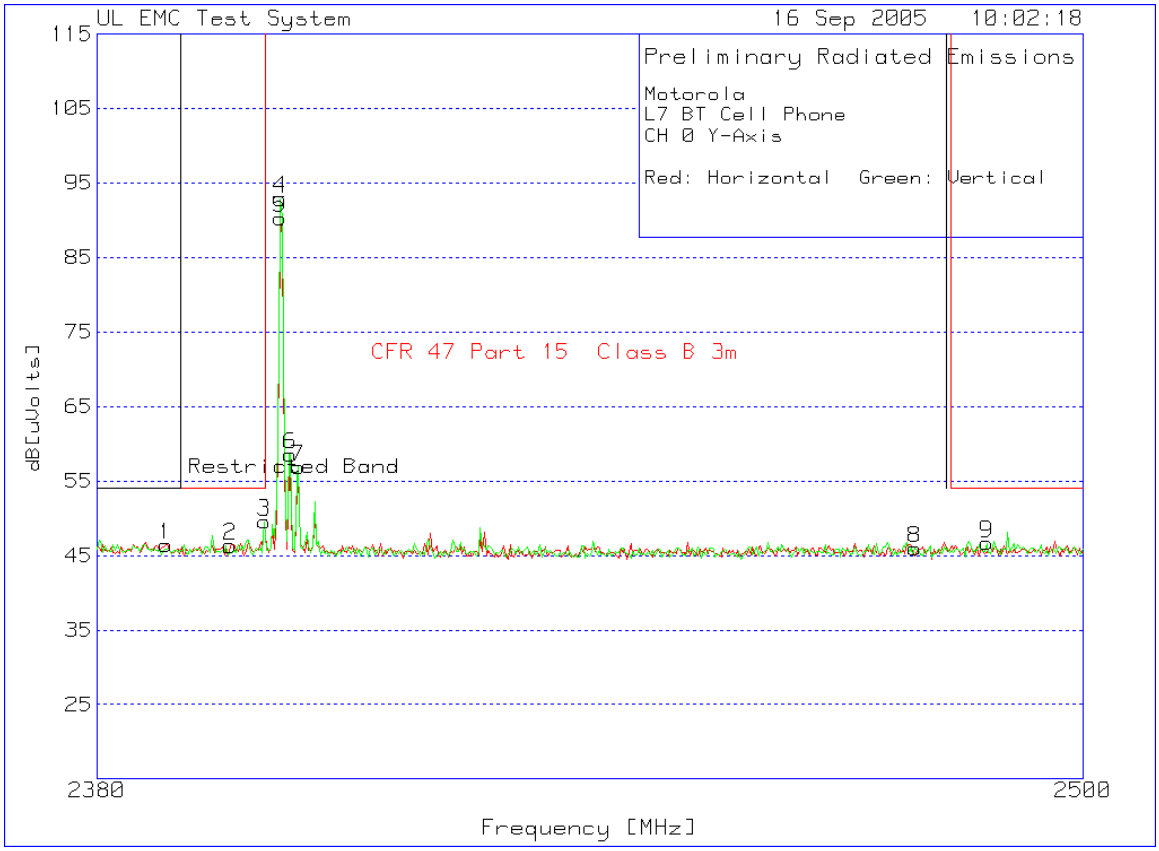


Authorized Band Emissions Low Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 0 X-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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Limit 3	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz													
1	2386.733	20.13	pk	4.4	21.8	46.33	54	-7.67	54	-7.67		149	Horz
2	2396.834	20.16	pk	4.4	21.8	46.36	54	-7.64	999	-952.64		100	Horz
3	2399.96		22.32	pk	4.4	21.8	48.52	54	-5.48	999	-950.48	100	Horz
4	2401.884	64.53	pk	4.4	21.8	90.73	999	-908.27	999	-908.27		100	Horz
6	2403.086	30.35	pk	4.4	21.8	56.55	999	-942.45	999	-942.45		100	Horz
7	2480.04		19.88	pk	4.1	22	45.98	999	-953.02	999	-953.02	100	Horz
8	2488.216	19.68	pk	4.1	22.1	45.88	54	-8.12	0	45.88		100	Horz
2 - 4GHz 2380 - 2500MHz													
5	2401.884	63.01	pk	4.4	21.8	89.21	999	-909.79	999	-909.79		149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

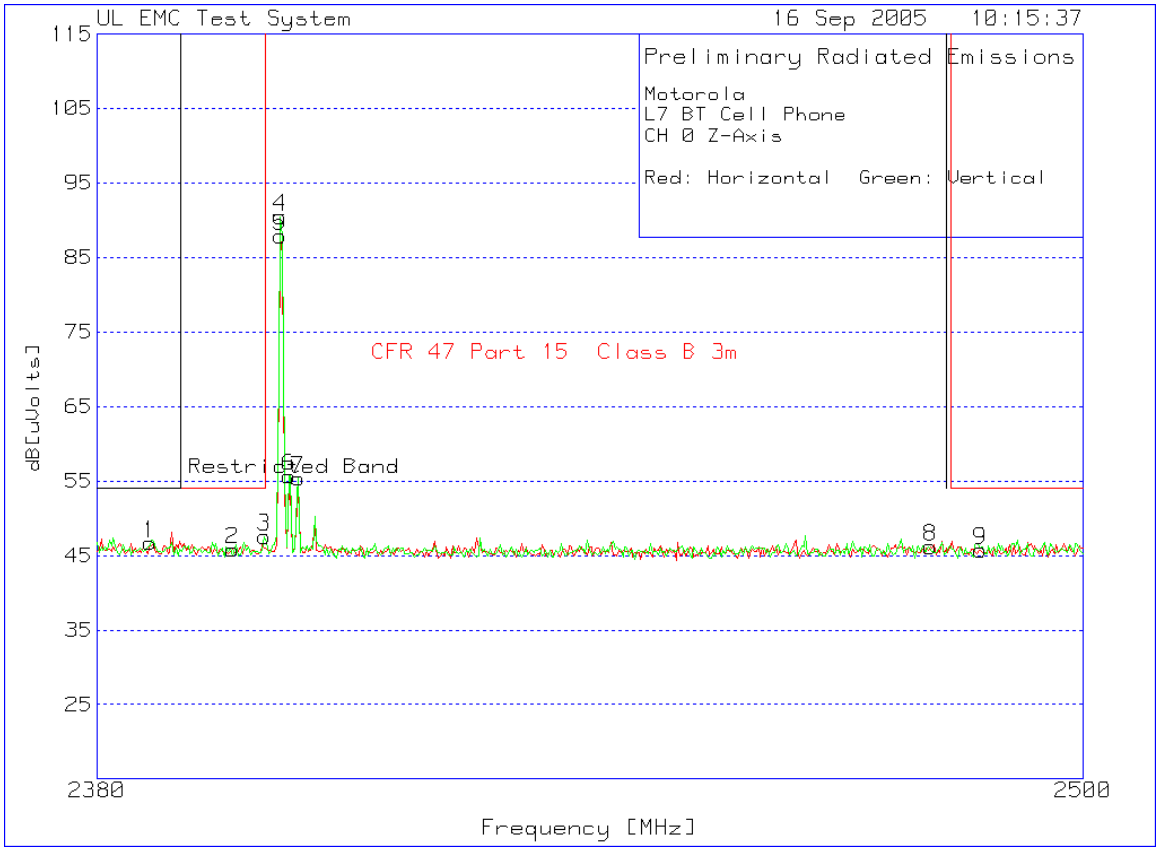


Authorized Band Emissions Low Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 0 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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2388.176	20.25	pk	4.4	21.8	46.45	54	-7.55	54	-7.55	149	Horz
2	2395.872	20.13	pk	4.4	21.8	46.33	54	-7.67	999	-952.67	100	Horz
5	2401.884	64.09	pk	4.4	21.8	90.29	999	-908.71	999	-908.71	100	Horz
2 - 4GHz 2380 - 2500MHz												
3	2399.96	23.36	pk	4.4	21.8	49.56	54	-4.44	999	-949.44	100	Vert
4	2401.884	66.73	pk	4.4	21.8	92.93	999	-906.07	999	-906.07	149	Vert
6	2403.086	32.38	pk	4.4	21.8	58.58	999	-940.42	999	-940.42	149	Vert
7	2404.048	30.71	pk	4.4	21.8	56.91	999	-942.09	999	-942.09	149	Vert
8	2479.078	19.88	pk	4.1	22	45.98	999	-953.02	999	-953.02	149	Vert
9	2487.976	20.48	pk	4.1	22.1	46.68	54	-7.32	0	46.68	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

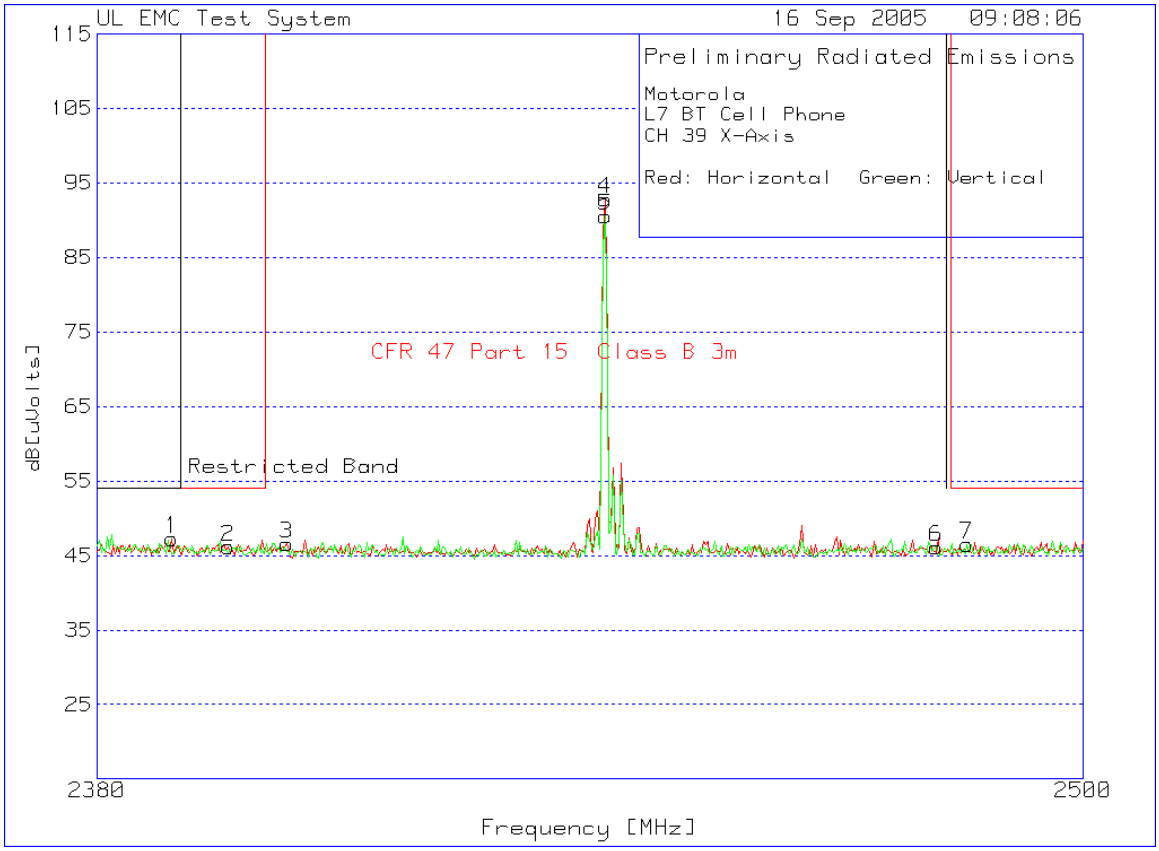


Authorized Band Emissions Low Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 0 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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2386.253	20.48	pk	4.4	21.8	46.68	54	-7.32	54	-7.32	150	Horz
2	2396.112	19.61	pk	4.4	21.8	45.81	54	-8.19	999	-953.19	100	Horz
5	2401.884	61.67	pk	4.4	21.8	87.87	999	-911.13	999	-911.13	100	Horz
8	2481.002	20.11	pk	4.1	22	46.21	999	-952.79	999	-952.79	150	Horz
9	2487.255	19.52	pk	4.1	22.1	45.72	54	-8.28	0	45.72	100	Horz
2 - 4GHz 2380 - 2500MHz												
3	2399.96	21.36	pk	4.4	21.8	47.56	54	-6.44	999	-951.44	100	Vert
4	2401.884	64.3	pk	4.4	21.8	90.5	999	-908.5	999	-908.5	100	Vert
6	2402.846	29.47	pk	4.4	21.8	55.67	999	-943.33	999	-943.33	100	Vert
7	2404.048	29.2	pk	4.4	21.8	55.4	999	-943.6	999	-943.6	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

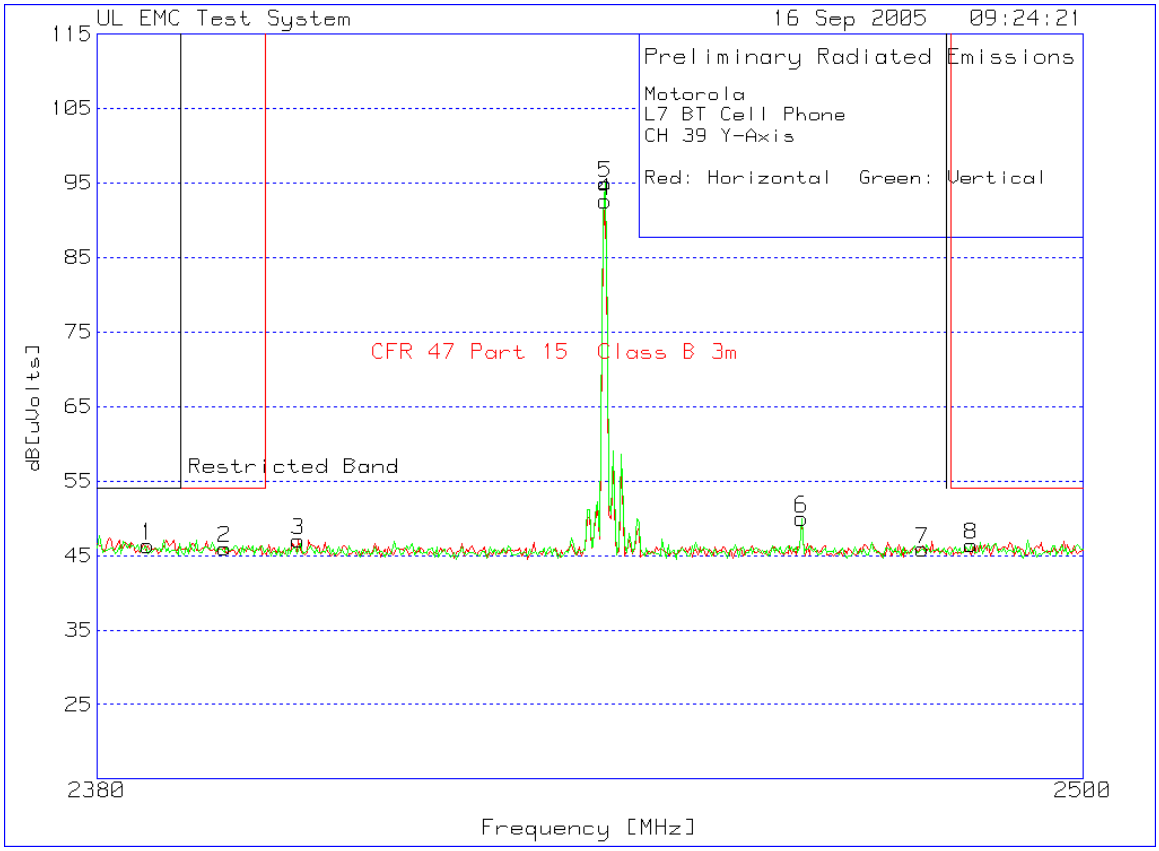


Authorized Band Emissions Mid Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 39 X-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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2388.898	21.05	pk	4.4	21.8	47.25	54	-6.75	54	-6.75	149	Horz
2	2395.631	19.97	pk	4.4	21.8	46.17	54	-7.83	999	-952.83	100	Horz
3	2402.605	20.34	pk	4.4	21.8	46.54	999	-952.46	999	-952.46	149	Horz
4	2441.082	66.75	pk	4.2	21.9	92.85	999	-906.15	999	-906.15	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2441.082	64.48	pk	4.2	21.9	90.58	999	-908.42	999	-908.42	149	Vert
6	2481.723	20.05	pk	4.1	22	46.15	999	-952.85	999	-952.85	100	Vert
7	2485.571	20.3	pk	4.1	22.1	46.5	54	-7.5	0	46.5	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

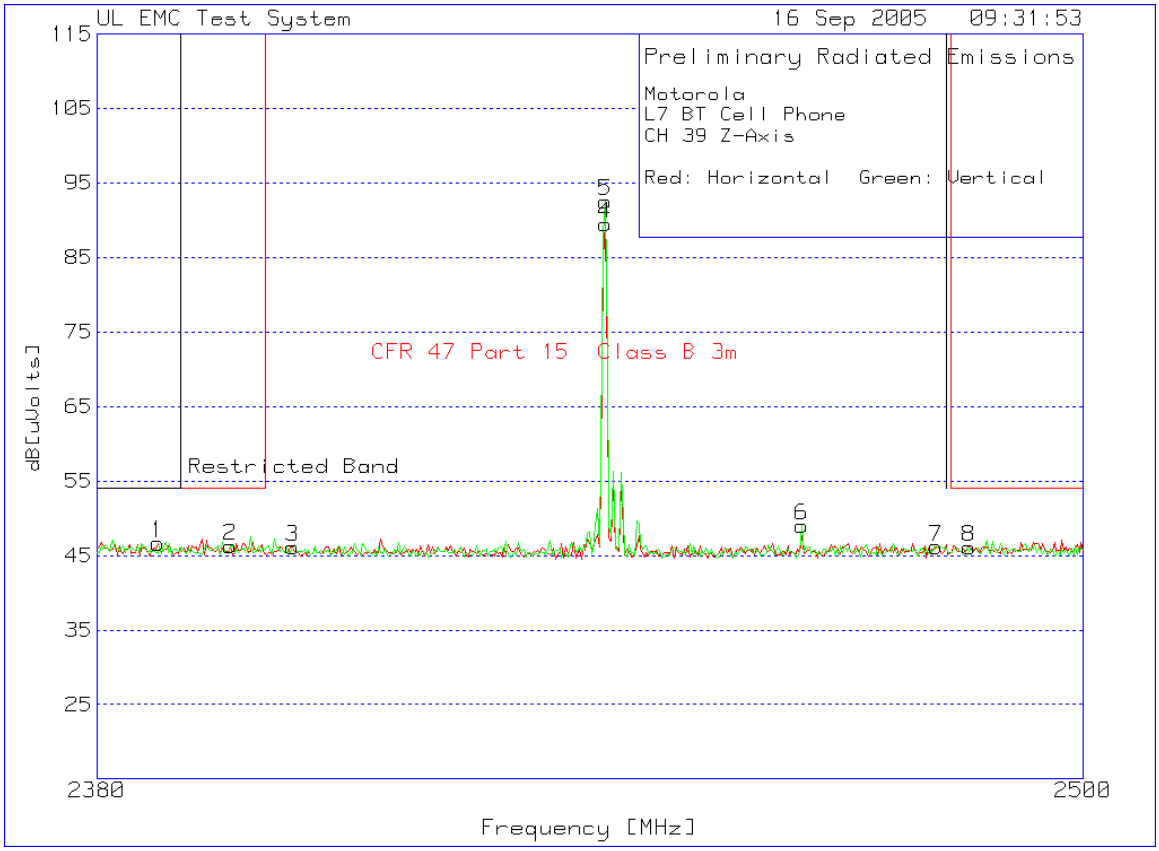


Authorized Band Emissions Mid Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 39 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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2386.012	20.15	pk	4.4	21.8	46.35	54	-7.65	54	-7.65	149	Horz
2	2395.15	19.77	pk	4.4	21.8	45.97	54	-8.03	999	-953.03	149	Horz
3	2404.048	20.82	pk	4.4	21.8	47.02	999	-951.98	999	-951.98	149	Horz
4	2441.082	66.51	pk	4.2	21.9	92.61	999	-906.39	999	-906.39	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2441.082	68.86	pk	4.2	21.9	94.96	999	-904.04	999	-904.04	150	Vert
6	2465.13	23.81	pk	4.2	22	50.01	999	-948.99	999	-948.99	150	Vert
7	2480.04	19.76	pk	4.1	22	45.86	999	-953.14	999	-953.14	100	Vert
8	2486.052	20.2	pk	4.1	22.1	46.4	54	-7.6	0	46.4	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

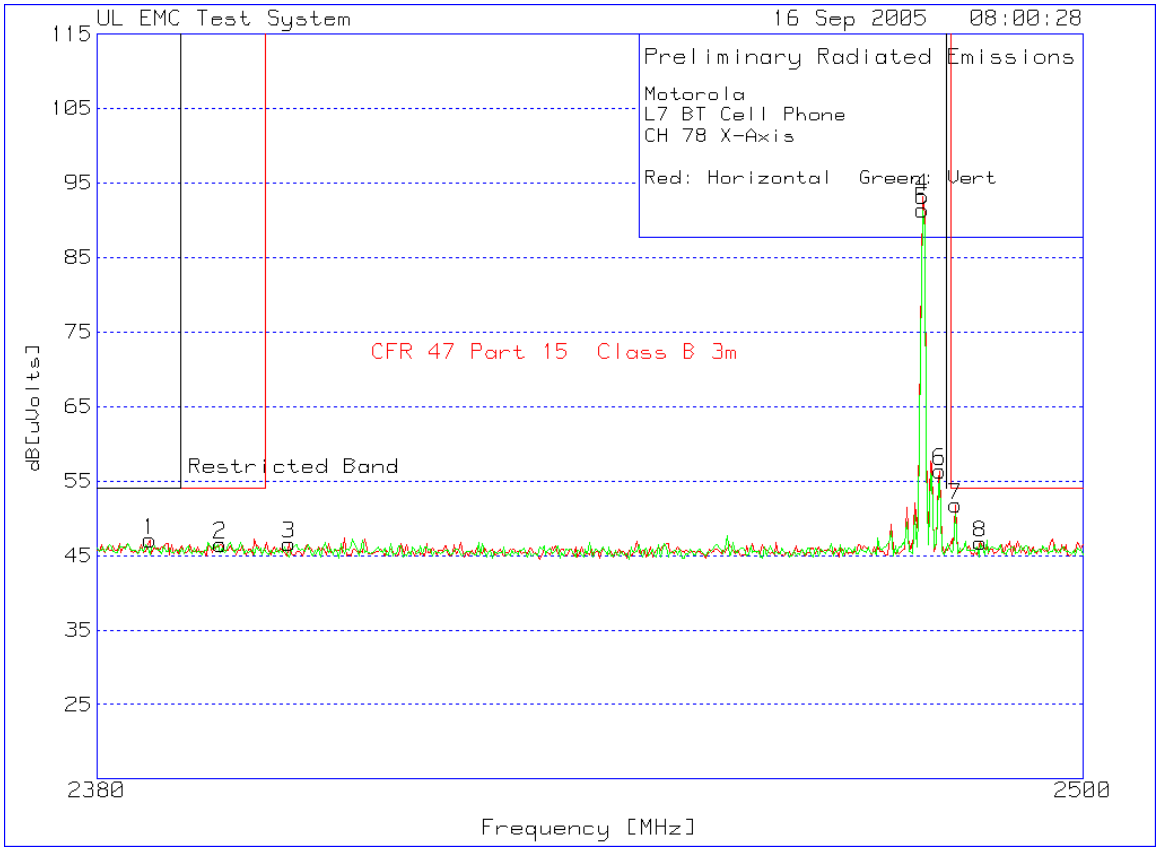


Authorized Band Emissions Mid Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 39 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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2387.214	20.44	pk	4.4	21.8	46.64	54	-7.36	54	-7.36	150	Horz
2	2395.872	20.08	pk	4.4	21.8	46.28	54	-7.72	999	-952.72	150	Horz
3	2403.327	19.93	pk	4.4	21.8	46.13	999	-952.87	999	-952.87	150	Horz
4	2441.082	63.42	pk	4.2	21.9	89.52	999	-909.48	999	-909.48	100	Horz
7	2481.723	20.06	pk	4.1	22	46.16	999	-952.84	999	-952.84	150	Horz
8	2485.812	19.93	pk	4.1	22.1	46.13	54	-7.87	0	46.13	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2441.082	66.44	pk	4.2	21.9	92.54	999	-906.46	999	-906.46	100	Vert
6	2465.13	22.83	pk	4.2	22	49.03	999	-949.97	999	-949.97	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

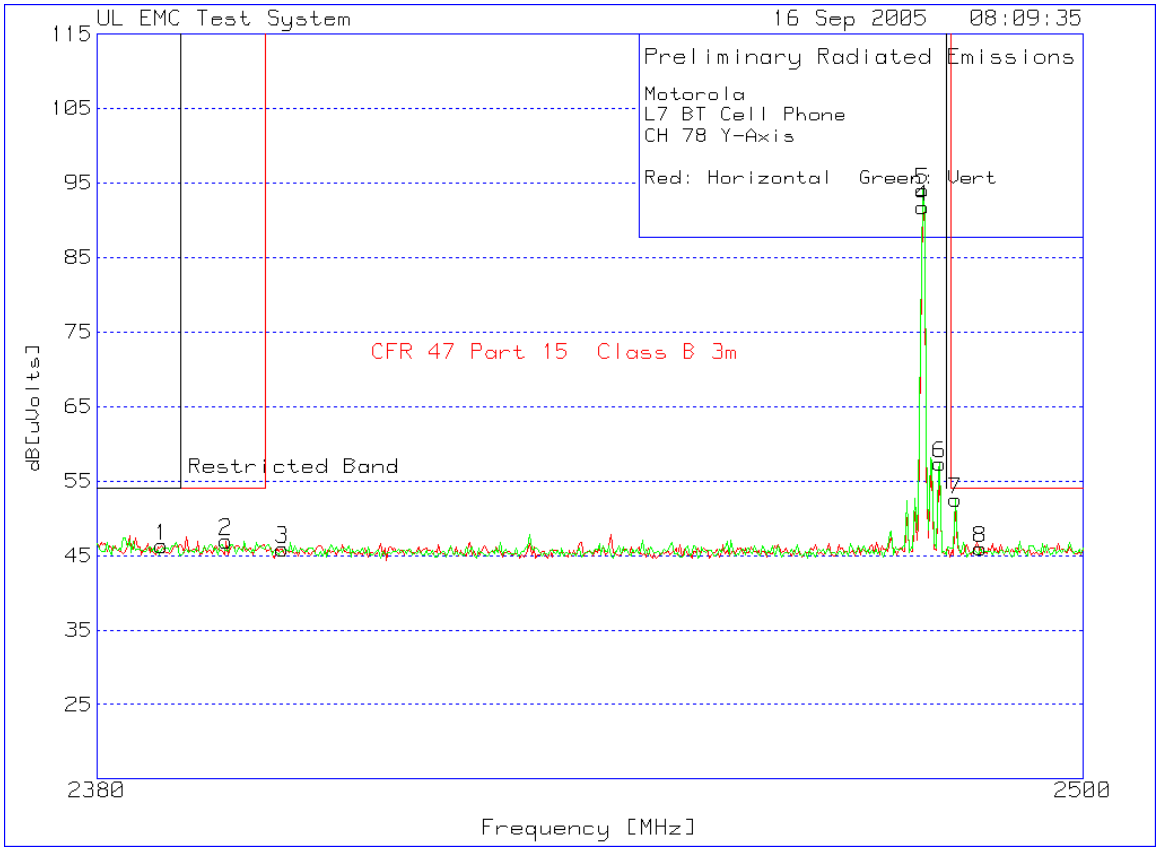


Authorized Band Emissions High Channel Dual Polarization X

Motorola
L7 BT Cell Phone
CH 78 X-Axis
Red: Horizontal Green: Vert

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]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2386.253	20.88	pk	4.4	21.8	47.08	54	-6.92	54	-6.92	149	Horz
2	2394.669	20.28	pk	4.4	21.8	46.48	54	-7.52	999	-952.52	100	Horz
3	2402.846	20.37	pk	4.4	21.8	46.57	999	-952.43	999	-952.43	100	Horz
4	2480.04	67.12	pk	4.1	22	93.22	999	-905.78	999	-905.78	100	Horz
6	2482.204	30.26	pk	4.1	22	56.36	999	-942.64	999	-942.64	100	Horz
7	2484.128	25.58	pk	4.1	22.1	51.78	54	-2.22	0	51.78	100	Horz
8	2487.255	20.49	pk	4.1	22.1	46.69	54	-7.31	0	46.69	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2480.04	65.3	pk	4.1	22	91.4	999	-907.6	999	-907.6	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

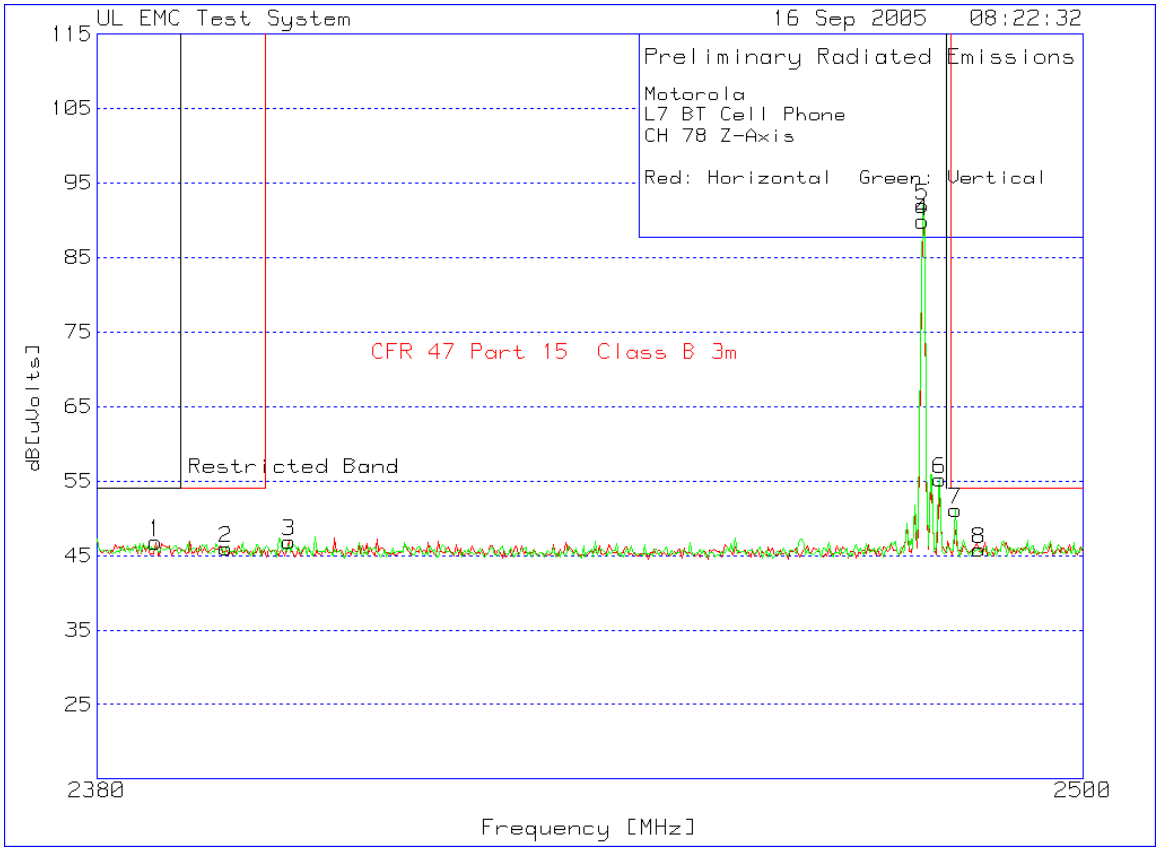


Authorized Band Emissions High Channel Dual Polarization Y

Motorola
L7 BT Cell Phone
CH 78 Y-Axis
Red: Horizontal Green: Vert

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]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2387.695	20.11	pk	4.4	21.8	46.31	54	-7.69	54	-7.69	149	Horz
2	2395.391	20.75	pk	4.4	21.8	46.95	54	-7.05	999	-952.05	100	Horz
3	2402.124	19.71	pk	4.4	21.8	45.91	999	-953.09	999	-953.09	100	Horz
4	2480.04	65.69	pk	4.1	22	91.79	999	-907.21	999	-907.21	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2480.04	67.92	pk	4.1	22	94.02	999	-904.98	999	-904.98	150	Vert
6	2482.204	31.27	pk	4.1	22	57.37	999	-941.63	999	-941.63	150	Vert
7	2484.128	26.32	pk	4.1	22.1	52.52	54	-1.48	0	52.52	150	Vert
8	2487.255	19.76	pk	4.1	22.1	45.96	54	-8.04	0	45.96	100	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m



Authorized Band Emissions High Channel Dual Polarization Z

Motorola
L7 BT Cell Phone
CH 78 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]	Limit 1	Margin 1[dB]	Limit 2	Margin 2[dB]	Height [cm]	Polarity
2 - 4GHz 2380 - 2500MHz												
1	2386.974	20.58	pk	4.4	21.8	46.78	54	-7.22	54	-7.22	149	Horz
2	2395.391	19.74	pk	4.4	21.8	45.94	54	-8.06	999	-953.06	100	Horz
3	2402.846	20.7	pk	4.4	21.8	46.9	999	-952.1	999	-952.1	100	Horz
4	2480.04	63.79	pk	4.1	22	89.89	999	-909.11	999	-909.11	100	Horz
2 - 4GHz 2380 - 2500MHz												
5	2480.04	65.87	pk	4.1	22	91.97	999	-907.03	999	-907.03	100	Vert
6	2482.204	29.11	pk	4.1	22	55.21	999	-943.79	999	-943.79	100	Vert
7	2484.128	24.92	pk	4.1	22.1	51.12	54	-2.88	0	51.12	100	Vert
8	2487.014	19.63	pk	4.1	22.1	45.83	54	-8.17	0	45.83	149	Vert

LIMIT 1: CFR 47 Part 15 Class B 3m

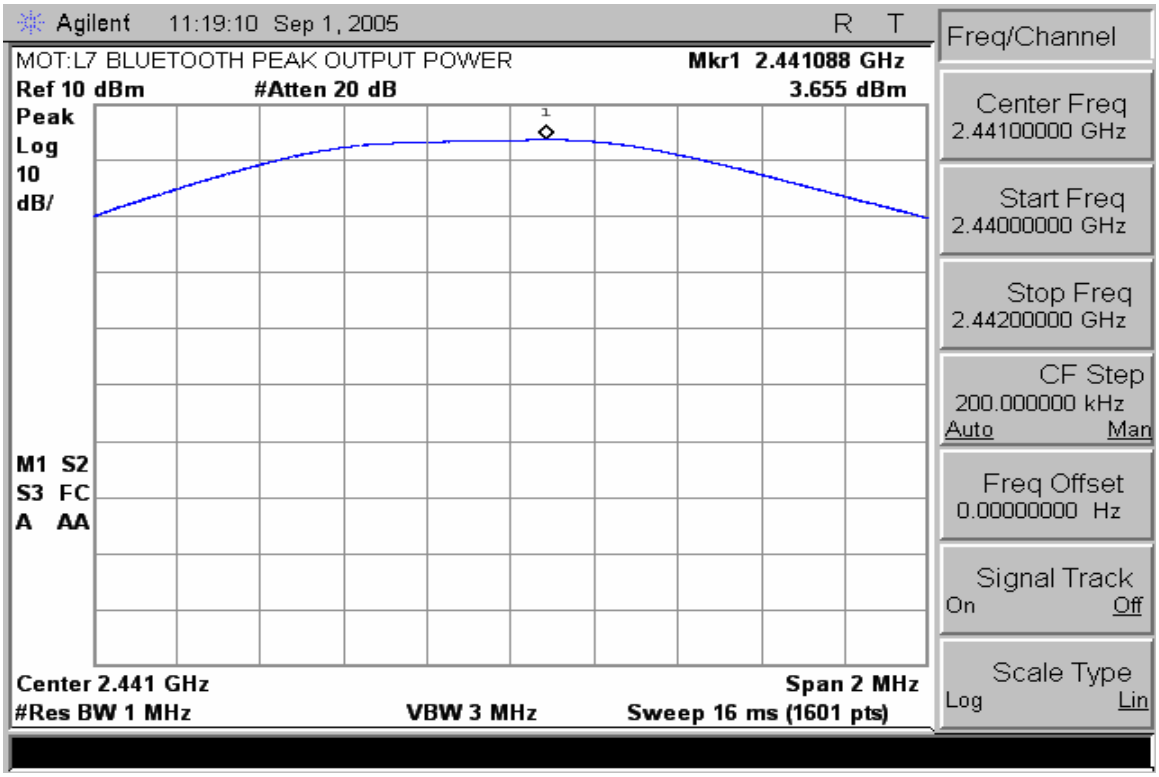
PEAK OUTPUT POWER

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

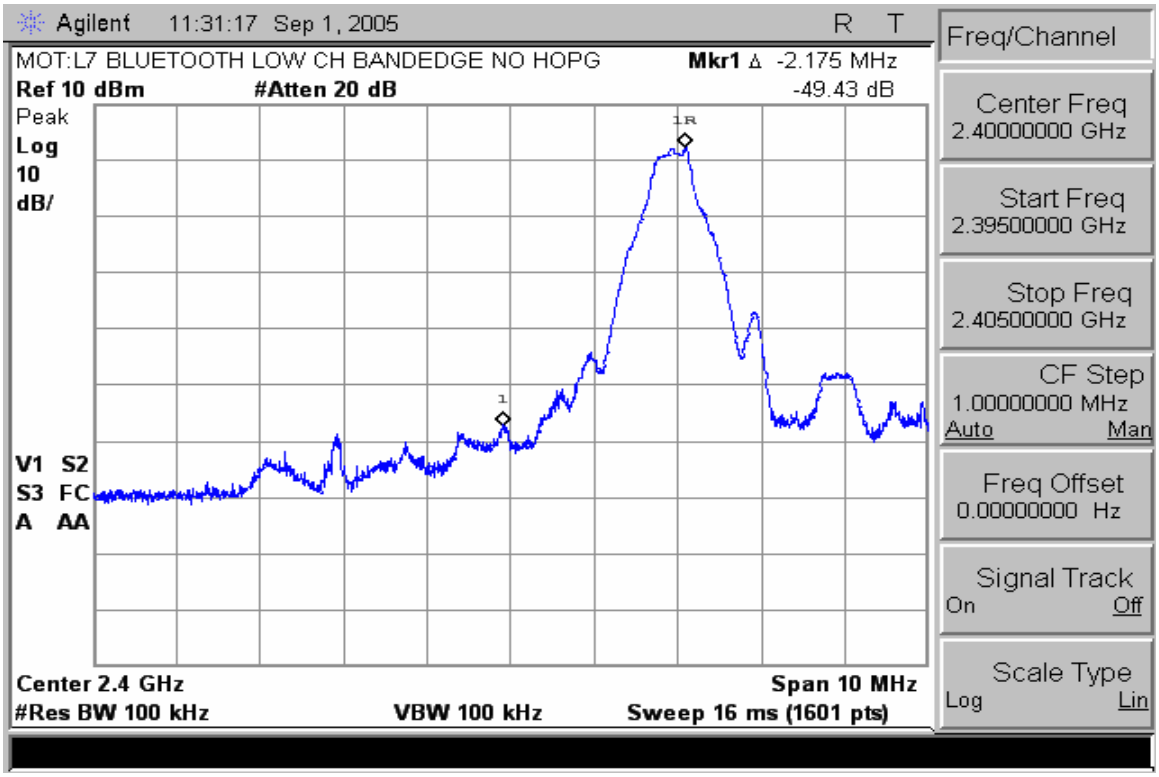
CFR 47 Part 15.247

Measurement Procedure

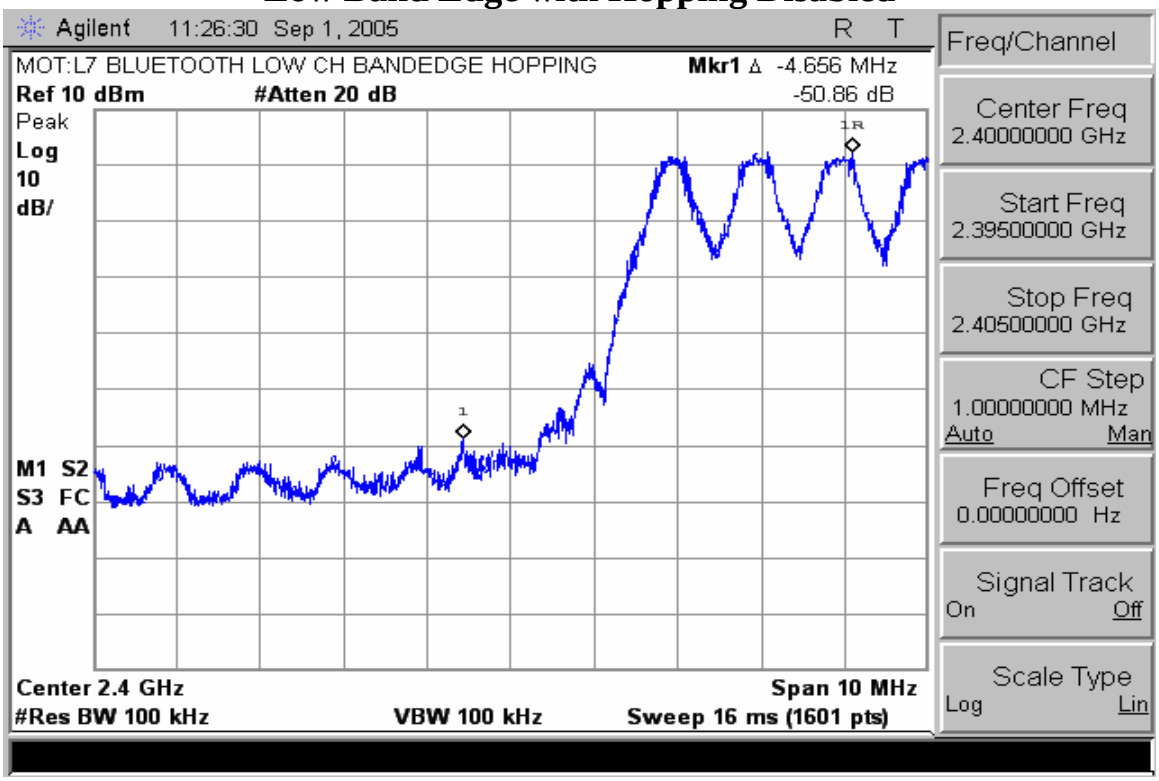
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

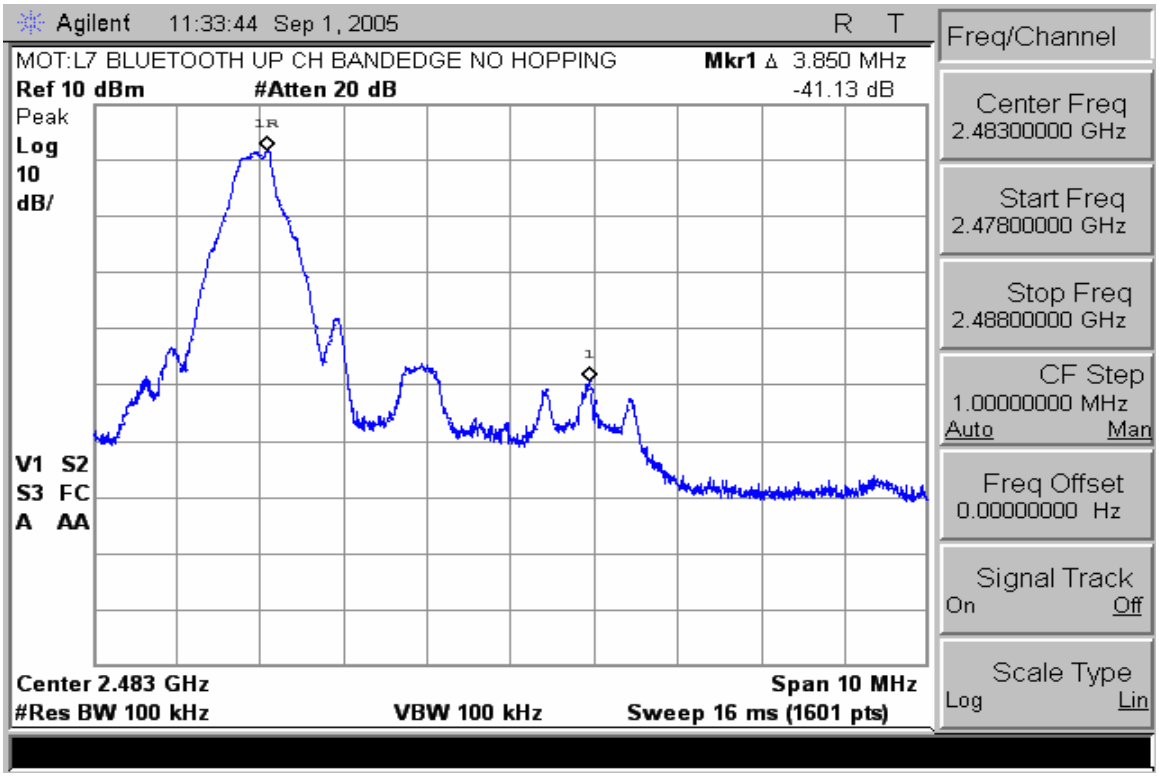
See Attached:



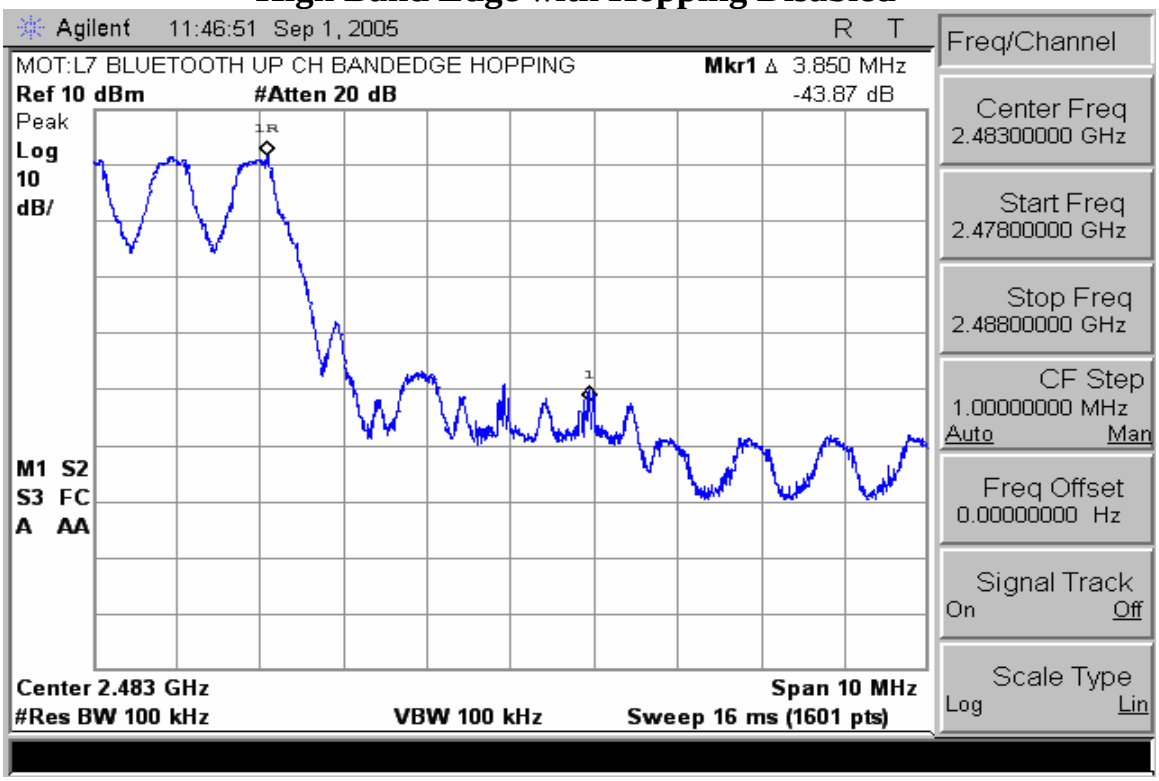
Low Band Edge with Hopping Disabled



Low Band Edge with Hopping Enabled



High Band Edge with Hopping Disabled



High Band Edge with Hopping Enabled

SPURIOUS RF CONDUCTED EMISSIONS

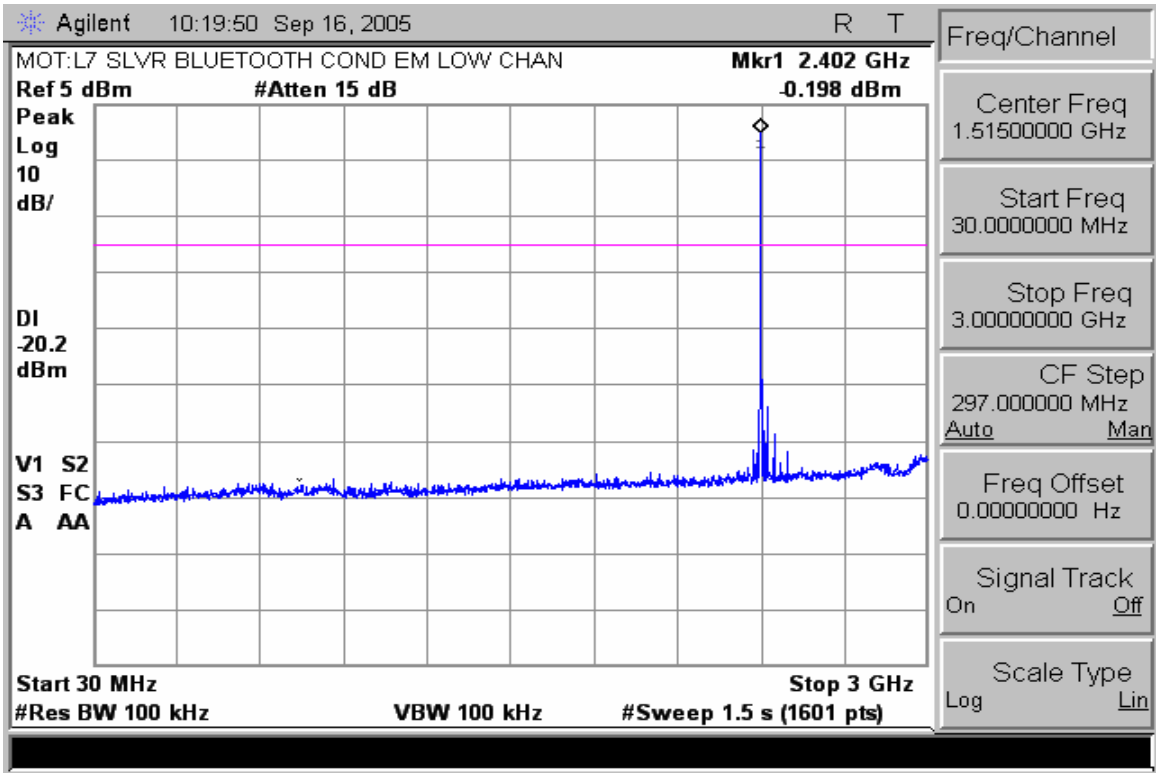
CFR 47 Part 15.247

Measurement Procedure

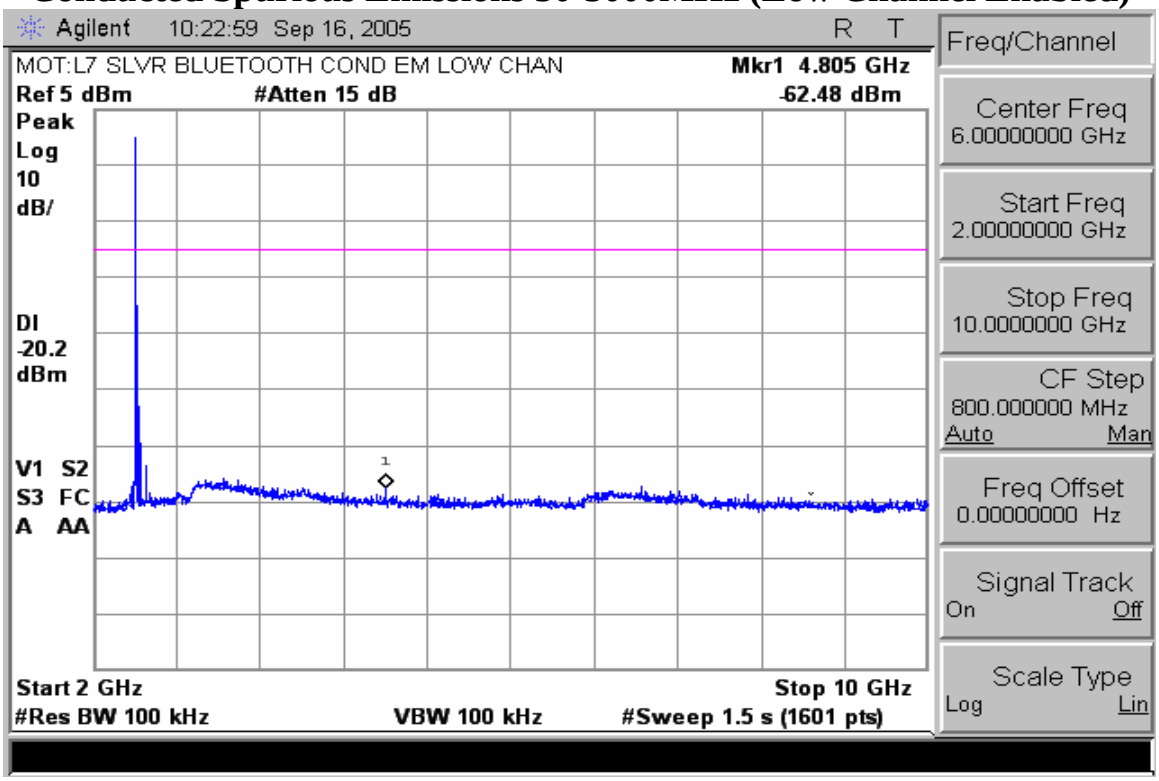
The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

Measurement Results

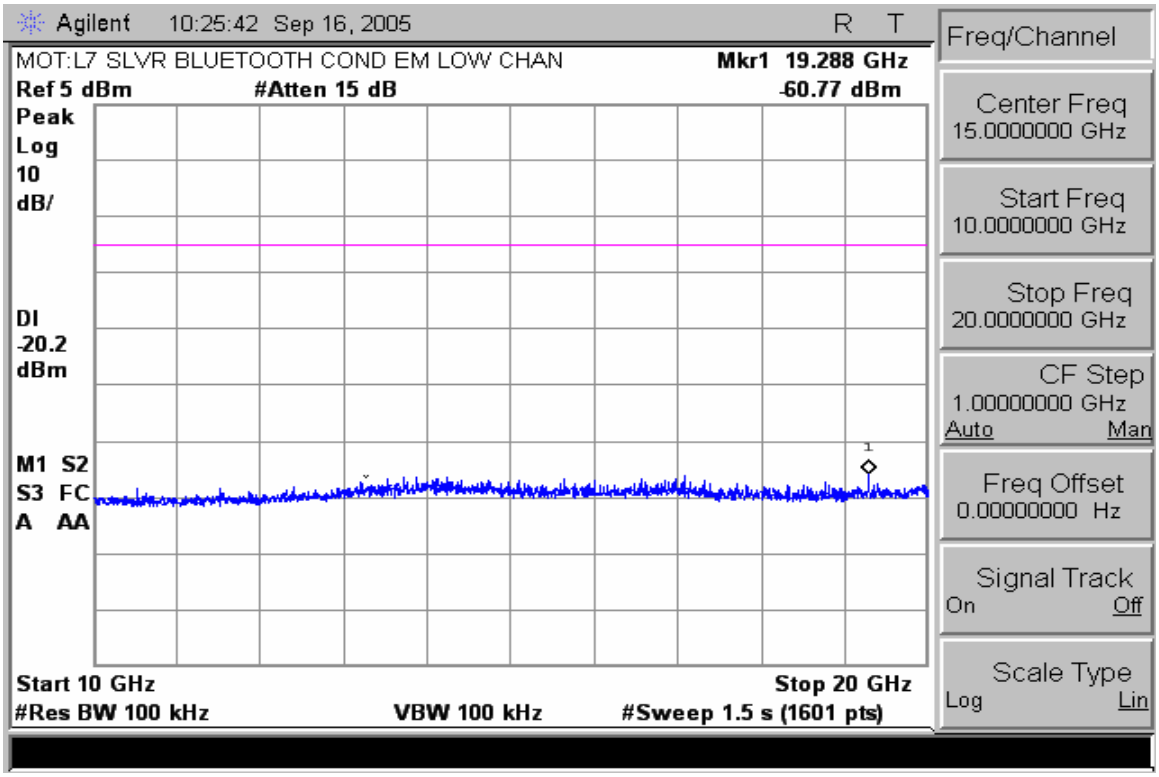
See attached:



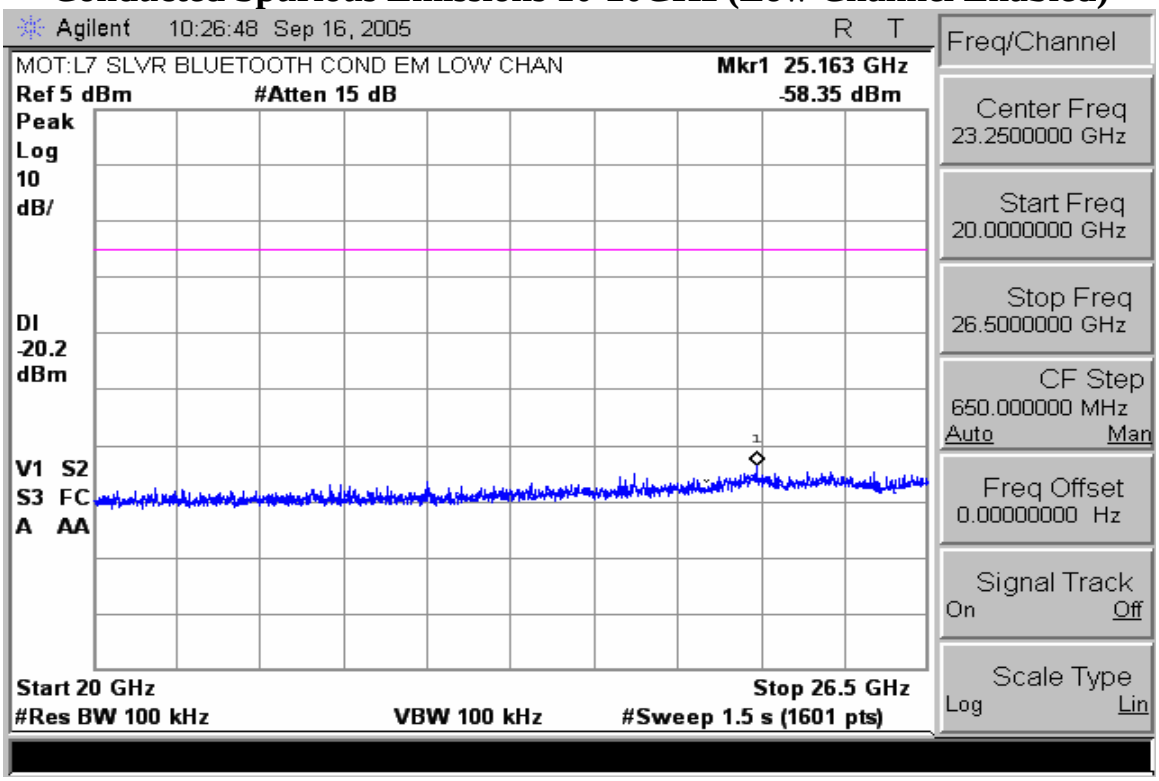
Conducted Spurious Emissions 30-3000MHz (Low Channel Enabled)



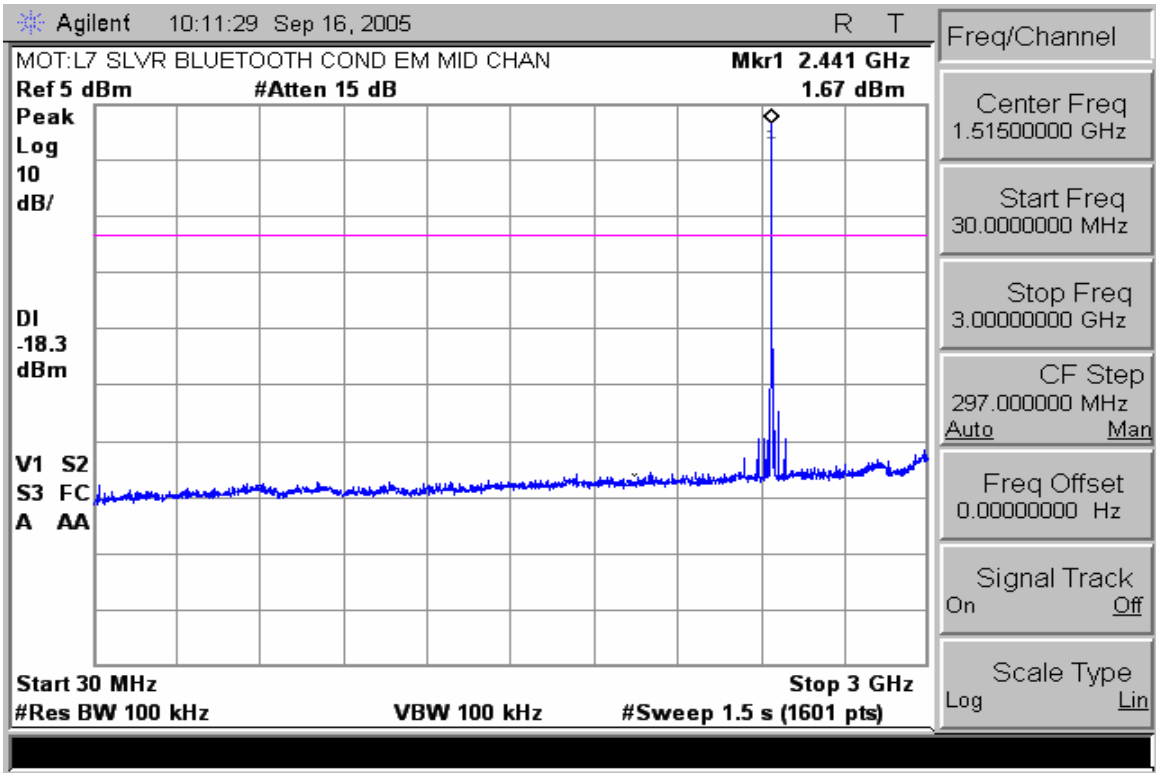
Conducted Spurious Emissions 2-10GHz (Low Channel Enabled)



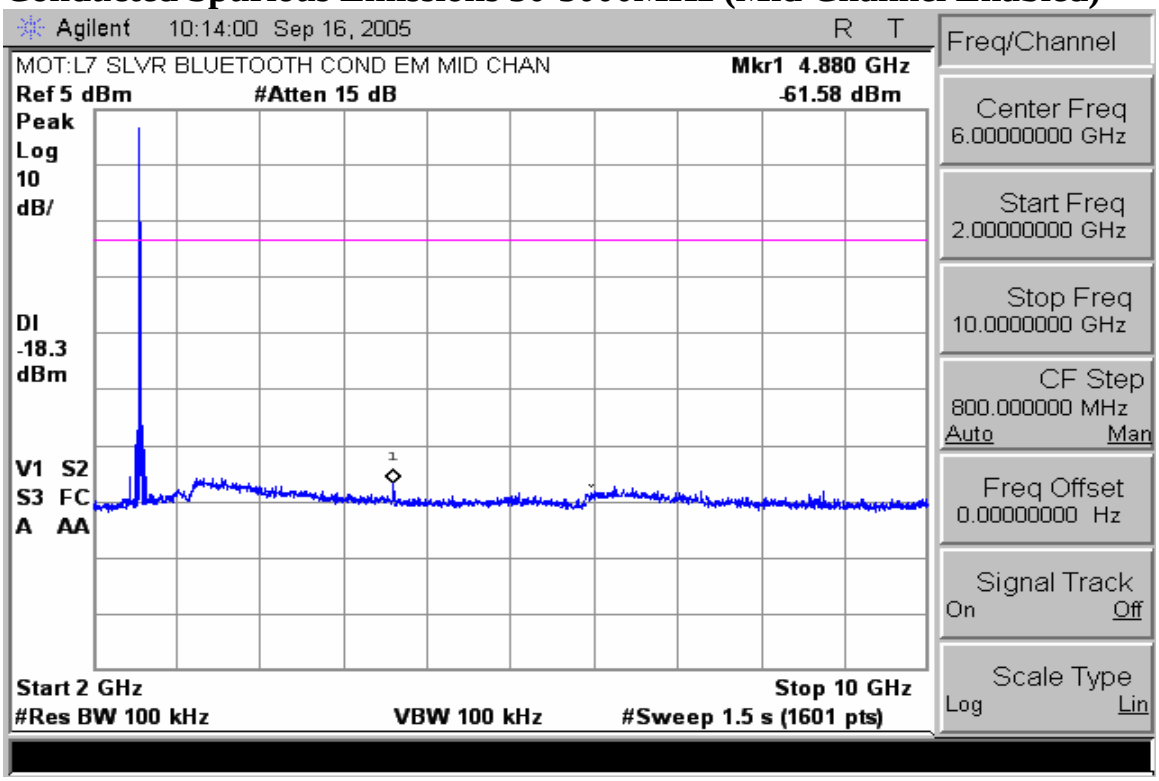
Conducted Spurious Emissions 10-20GHz (Low Channel Enabled)



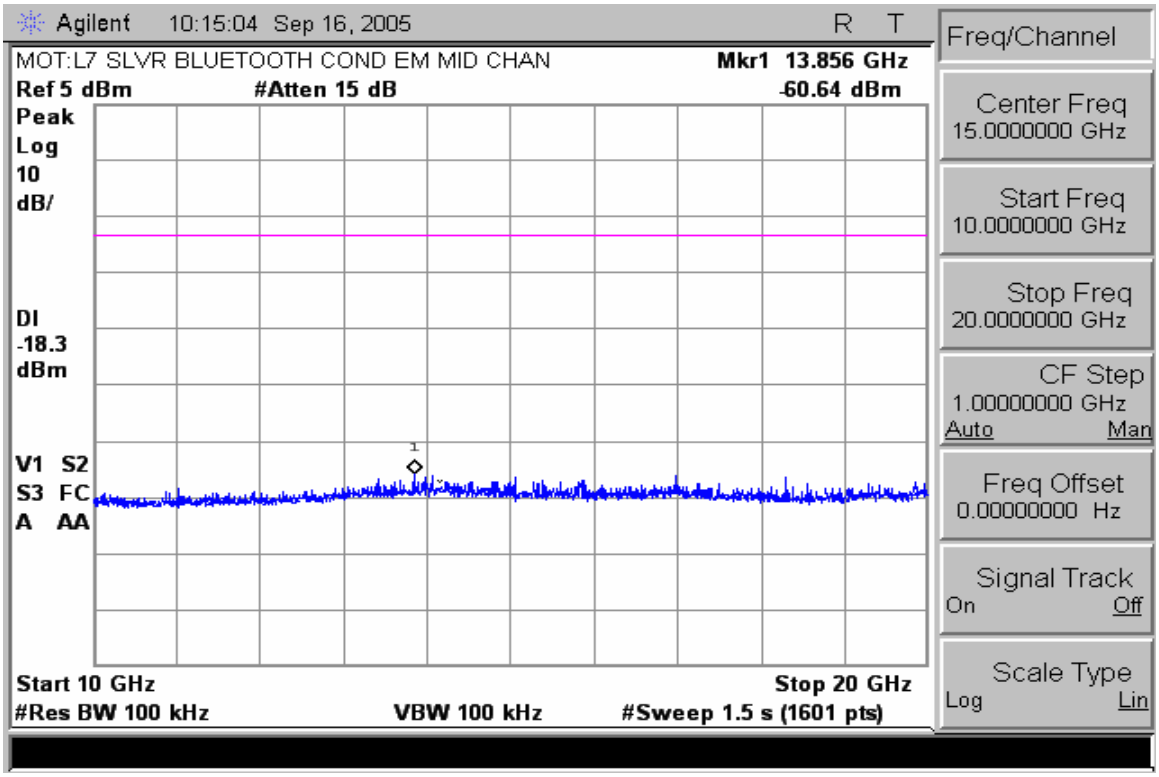
Conducted Spurious Emissions 20-26.5GHz (Low Channel Enabled)



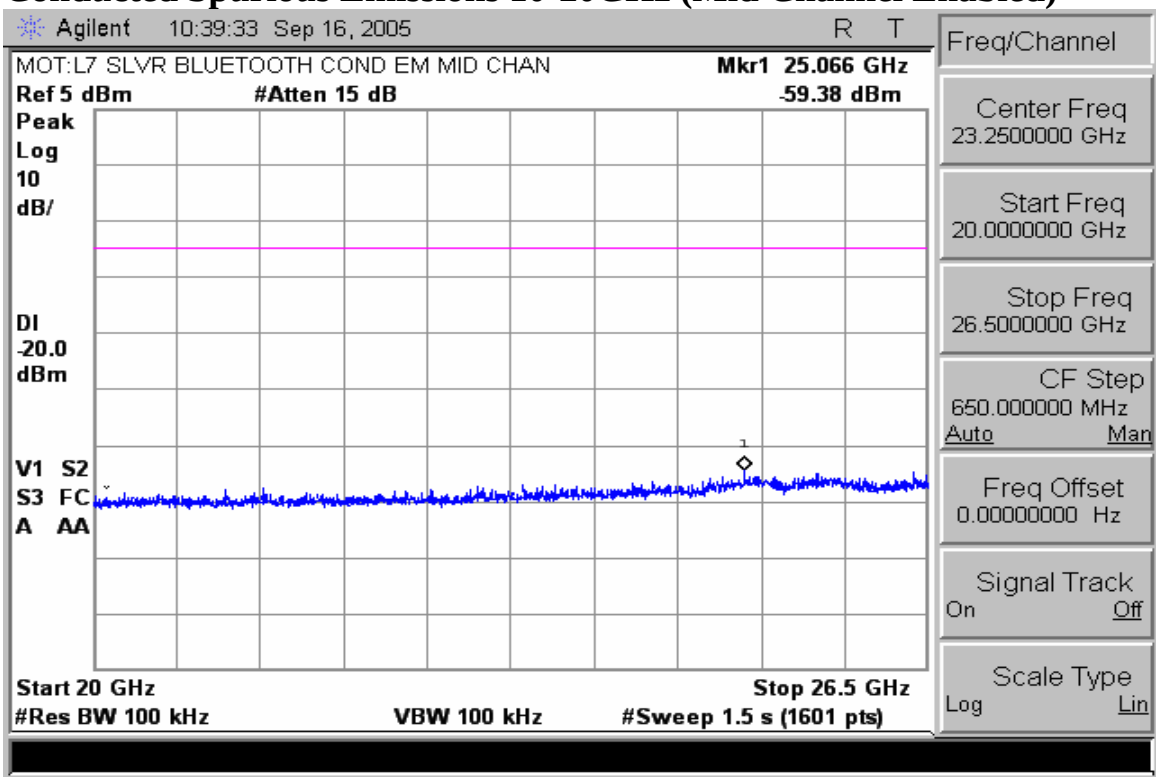
Conducted Spurious Emissions 30-3000MHz (Mid Channel Enabled)



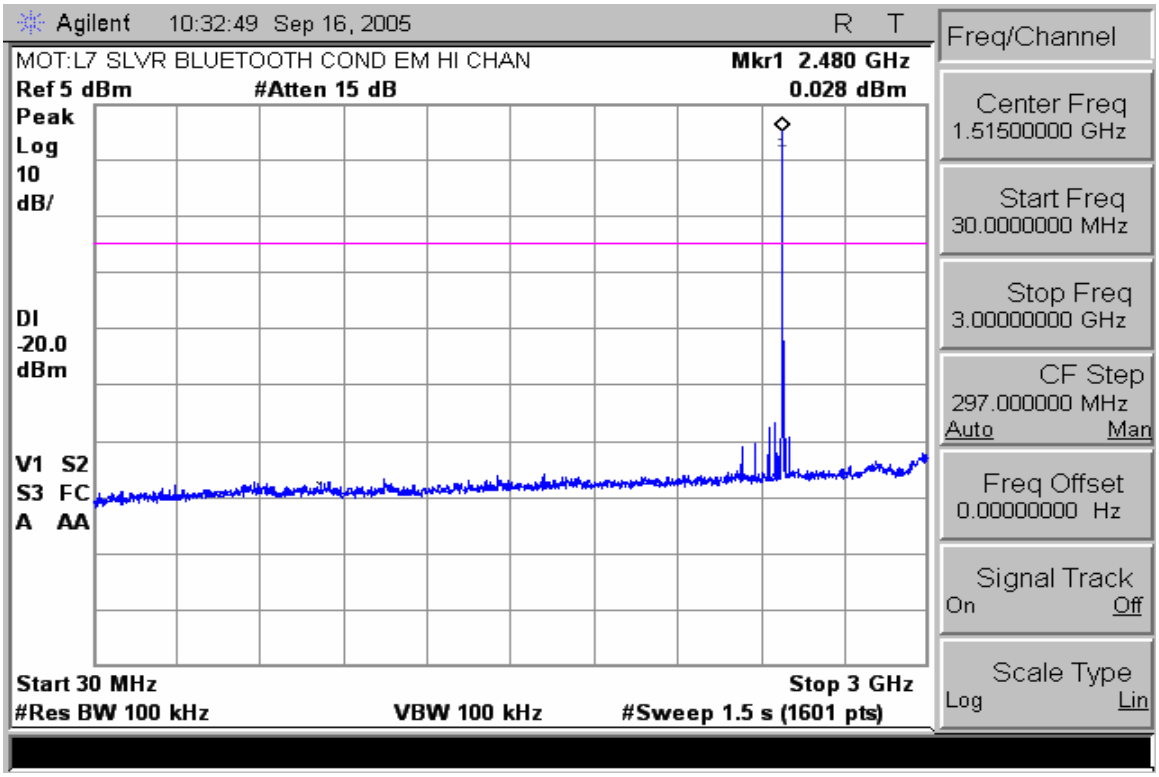
Conducted Spurious Emissions 2-10GHz (Mid Channel Enabled)



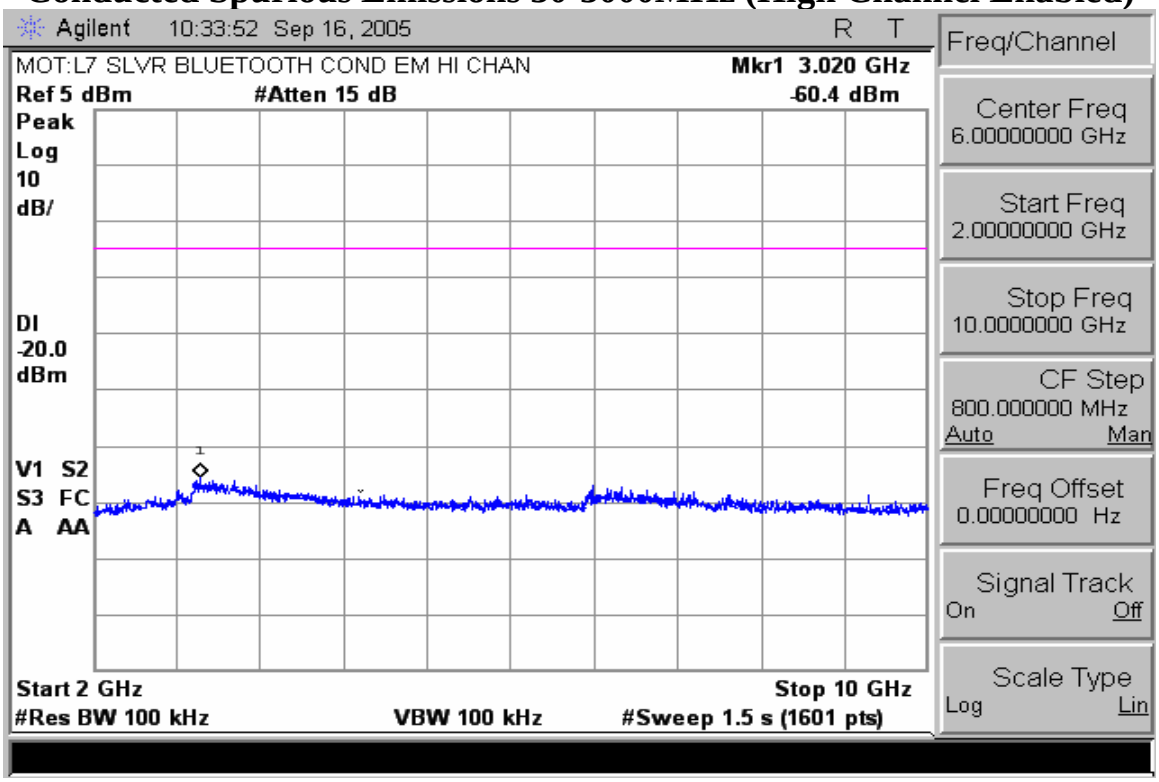
Conducted Spurious Emissions 10-20GHz (Mid Channel Enabled)



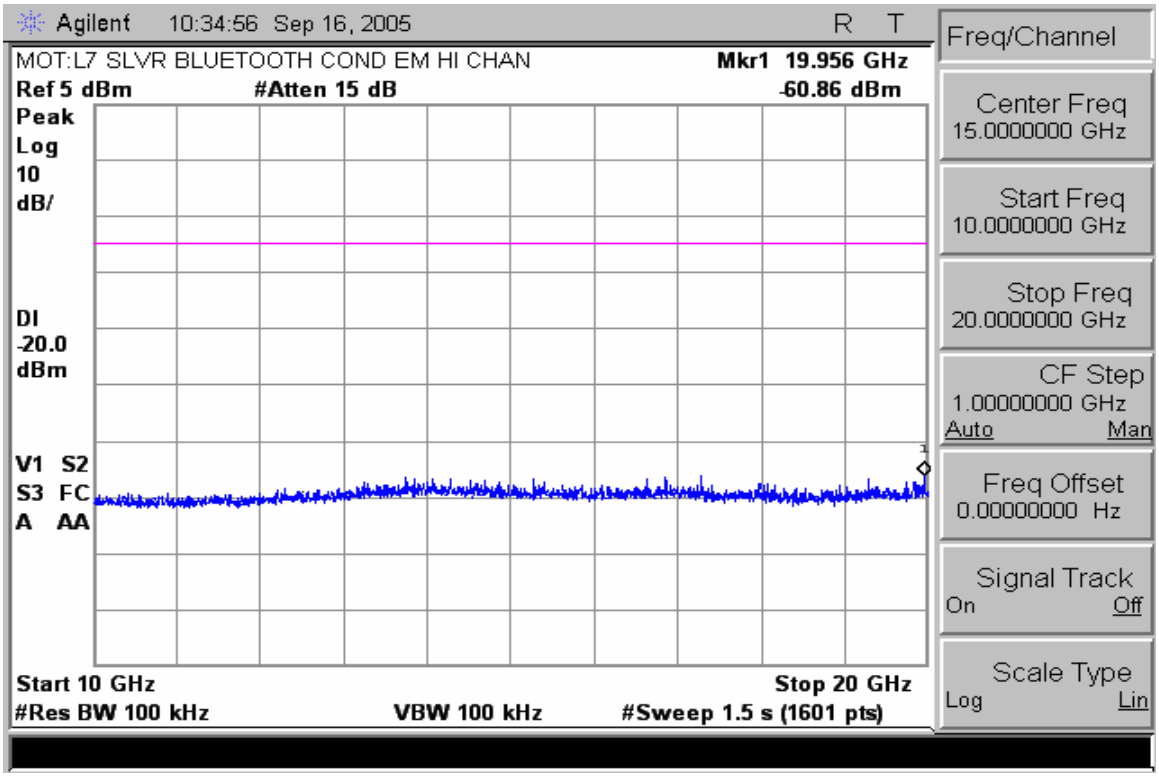
Conducted Spurious Emissions 20-26.5GHz (Mid Chan Enabled)



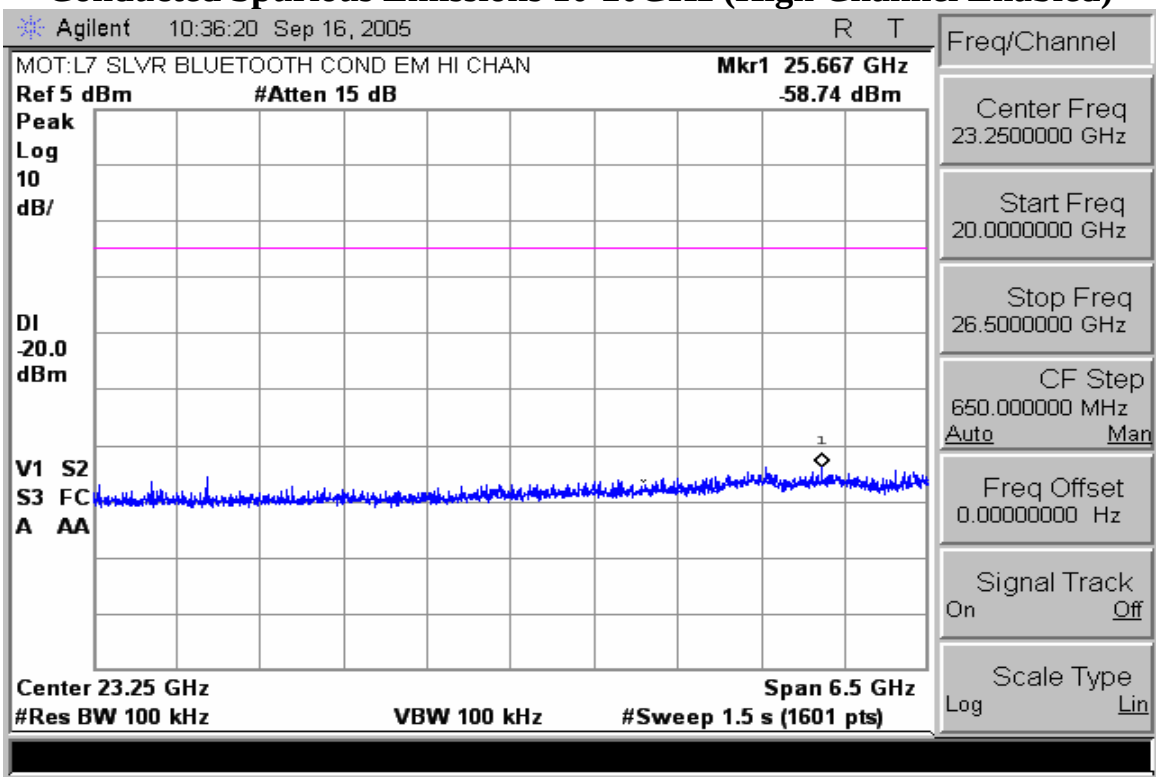
Conducted Spurious Emissions 30-3000MHz (High Channel Enabled)



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)

AC LINE CONDUCTED

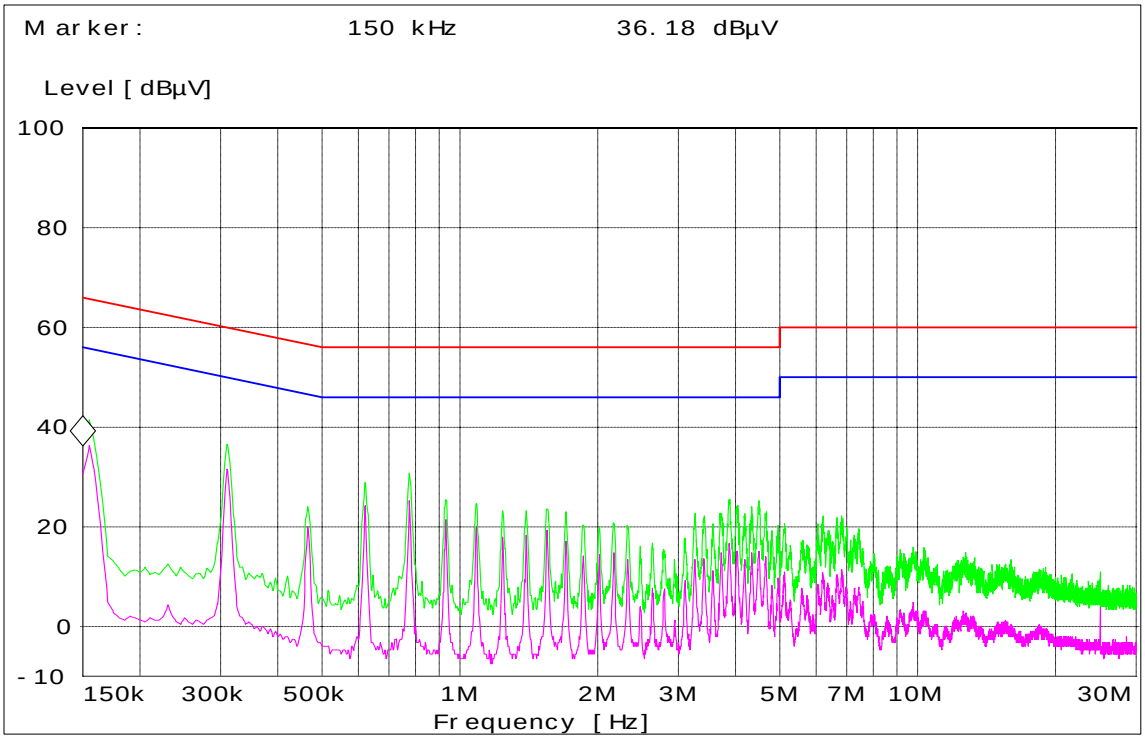
CFR 47 Part 15.207

Measurement Procedure

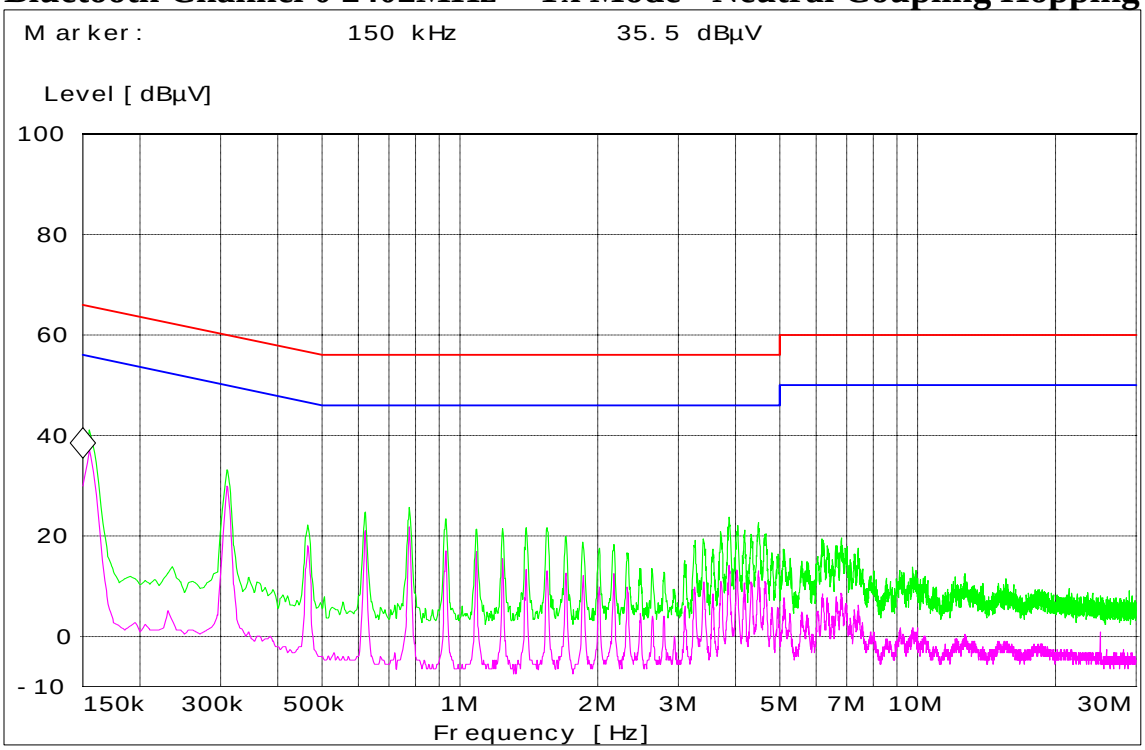
Measured levels of ac powerline conducted emission shall be the radio-noise voltage from the line probe or across the 50 Ω LISN port, where permitted, terminated into a 50 Ω noise meter, or where permitted or required, the radio-noise current on the powerline sensed by a current probe.
All radio-noise voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord or calibrated extension cord by the use of mating plugs and receptacles on the EUT and LISN. Equipment shall be tested with power cords that are normally supplied using an LISN, the 50 Ω measuring port is terminated by a 50 Ω radio-noise meter or a 50 Ω resistive load. All other ports are terminated in 50 Ω.

Measurement Results

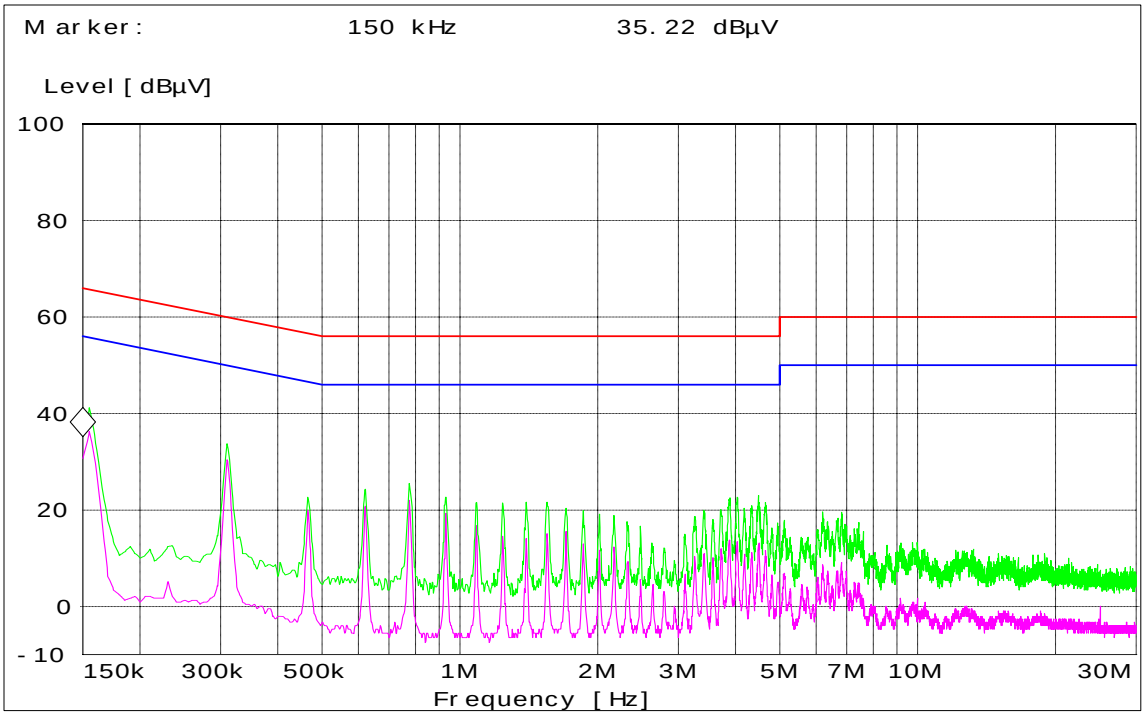
See attached:



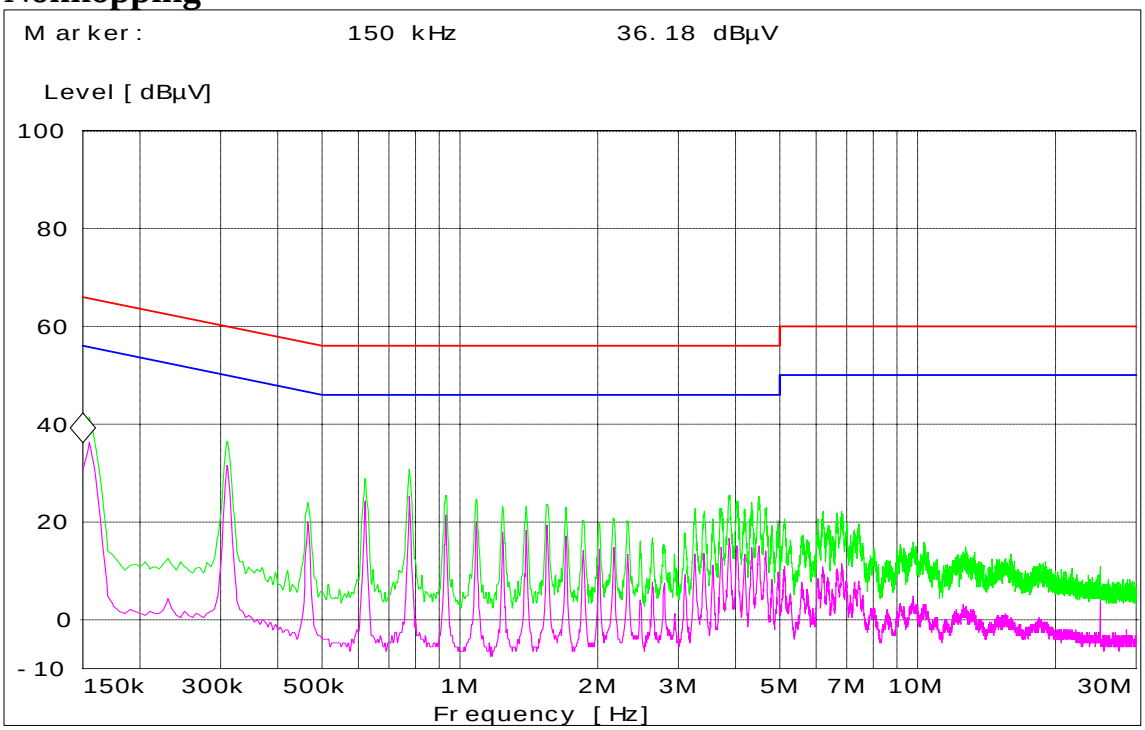
Bluetooth Channel 0 2402MHz - Tx Mode - Neutral Coupling Hopping



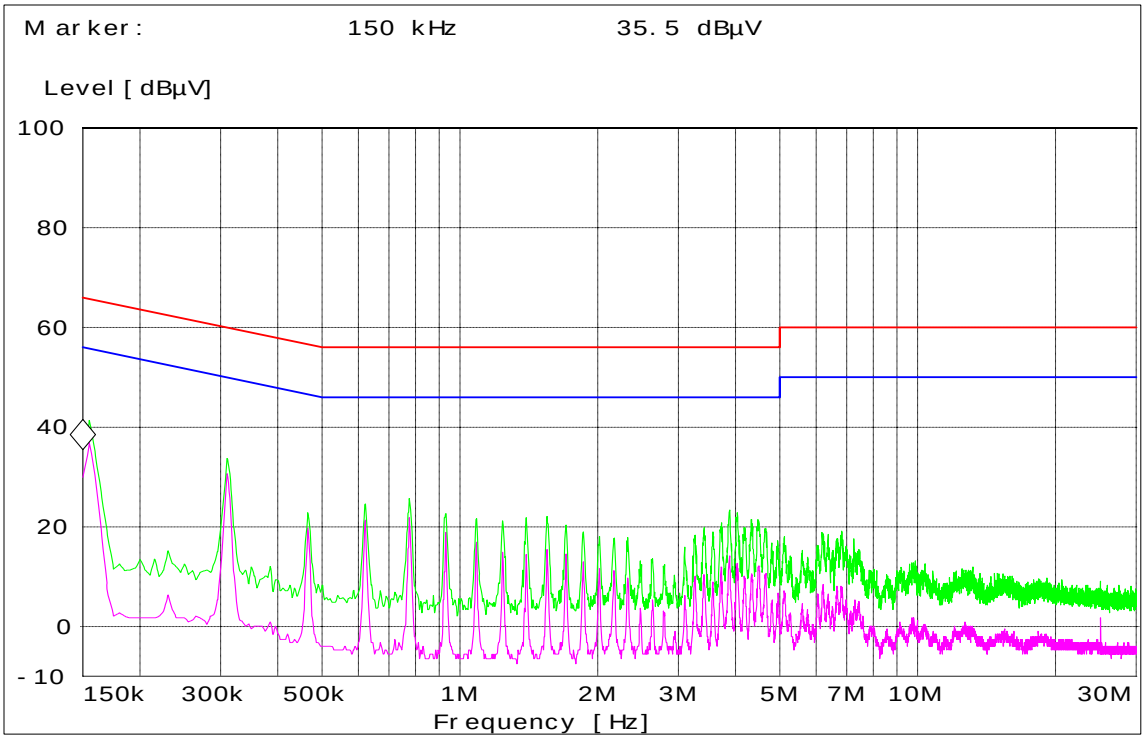
Bluetooth Channel 0 2402MHz - Tx Mode – Line Coupling Nonhopping



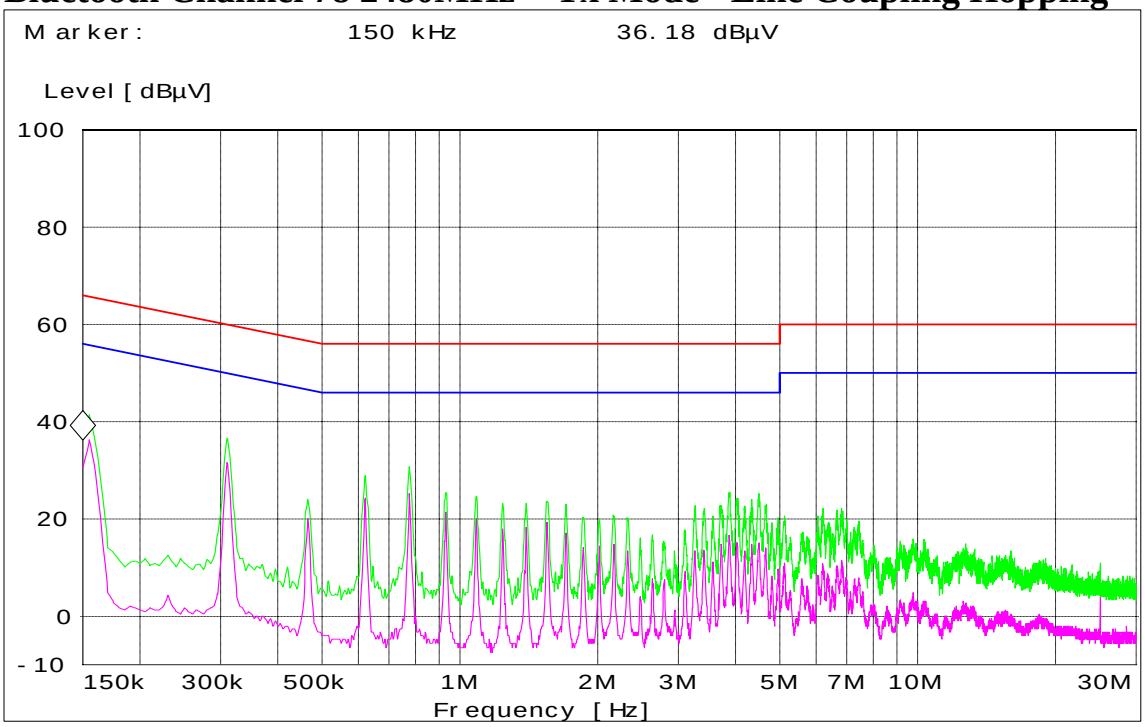
Bluetooth Channel 39 2441MHz - Tx Mode - Line Coupling Nonhopping



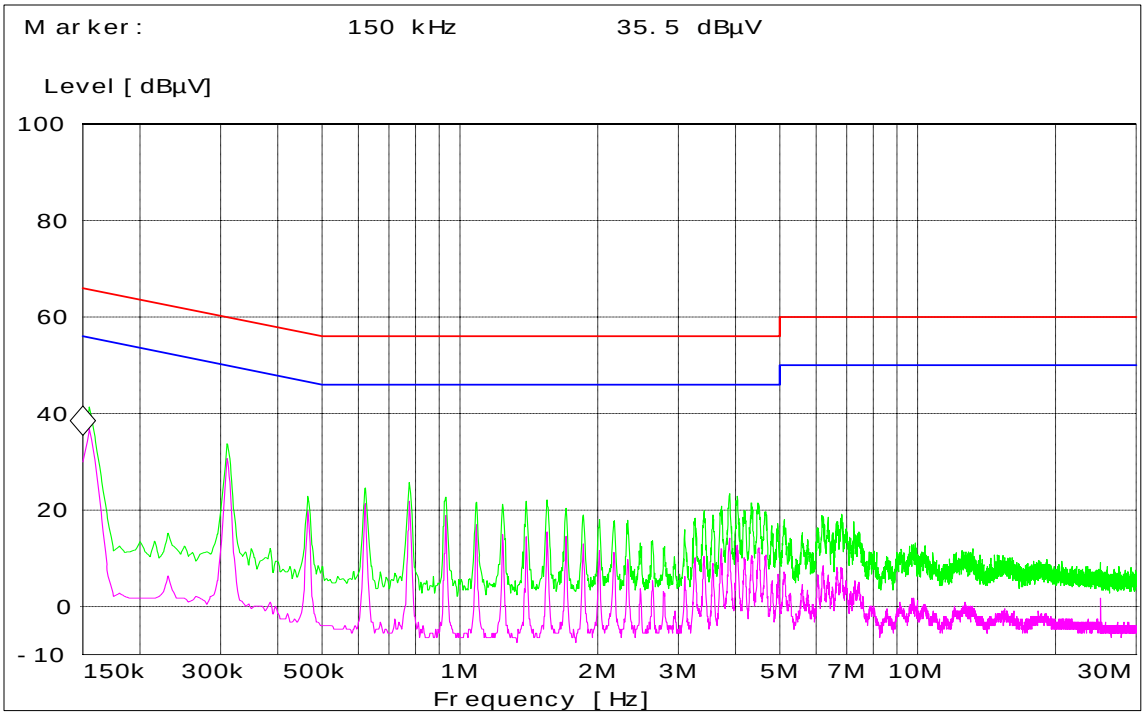
Bluetooth Channel 39 2441MHz - Tx Mode - Neutral Coupling Hopping



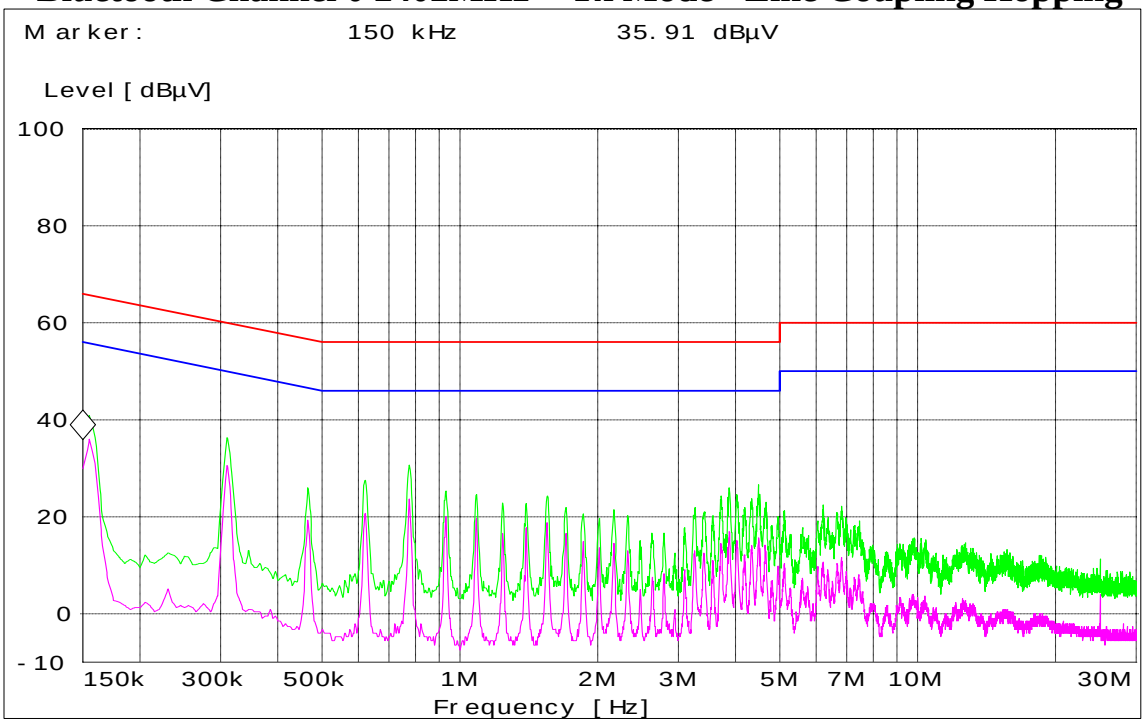
Bluetooth Channel 78 2480MHz - Tx Mode - Line Coupling Hopping



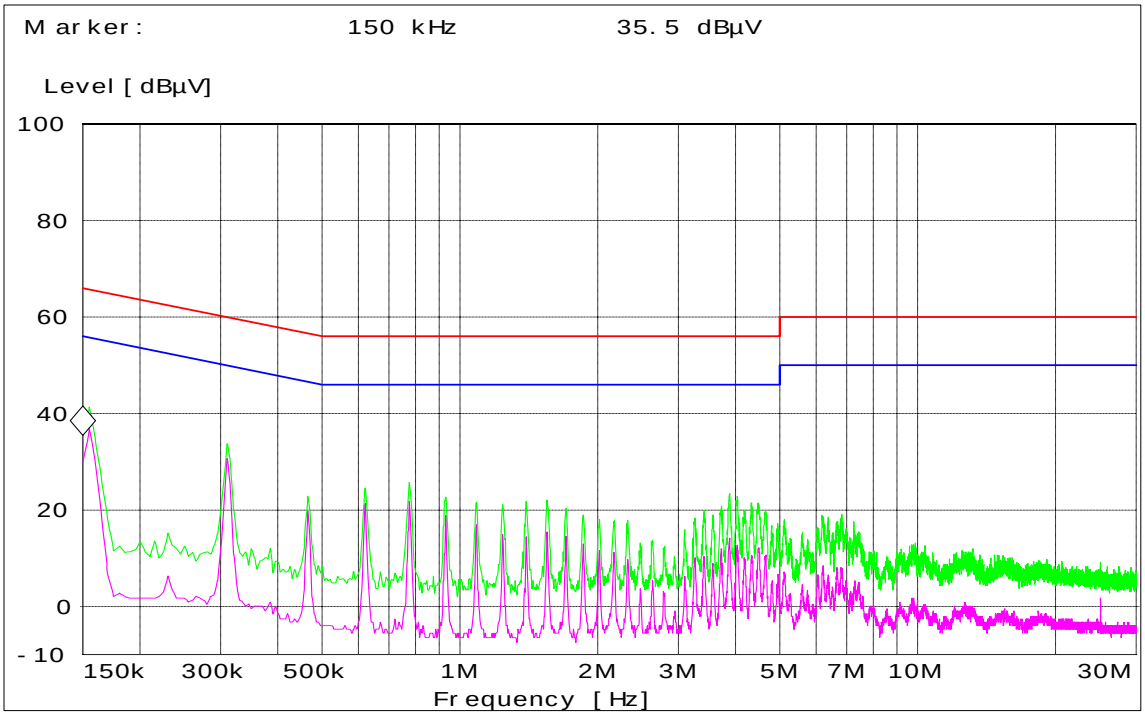
Bluetooth Channel 78 2480MHz - Tx Mode - Neutral Coupling Hopping



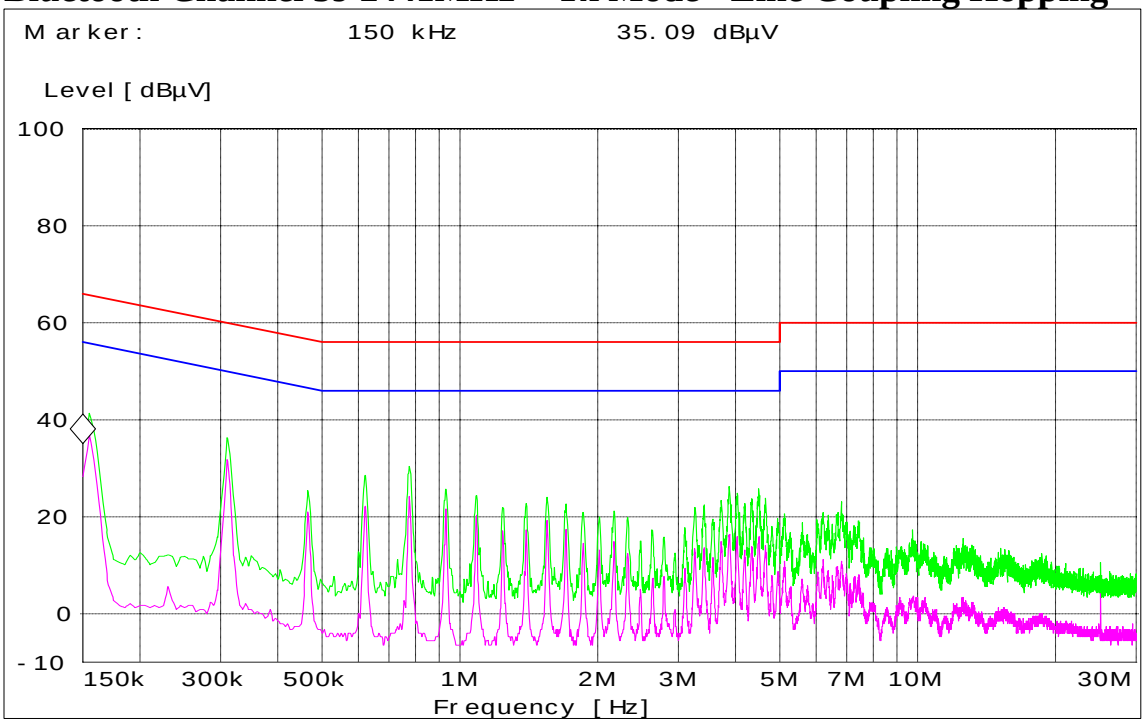
Bluetooth Channel 0 2402MHz - Tx Mode - Line Coupling Hopping



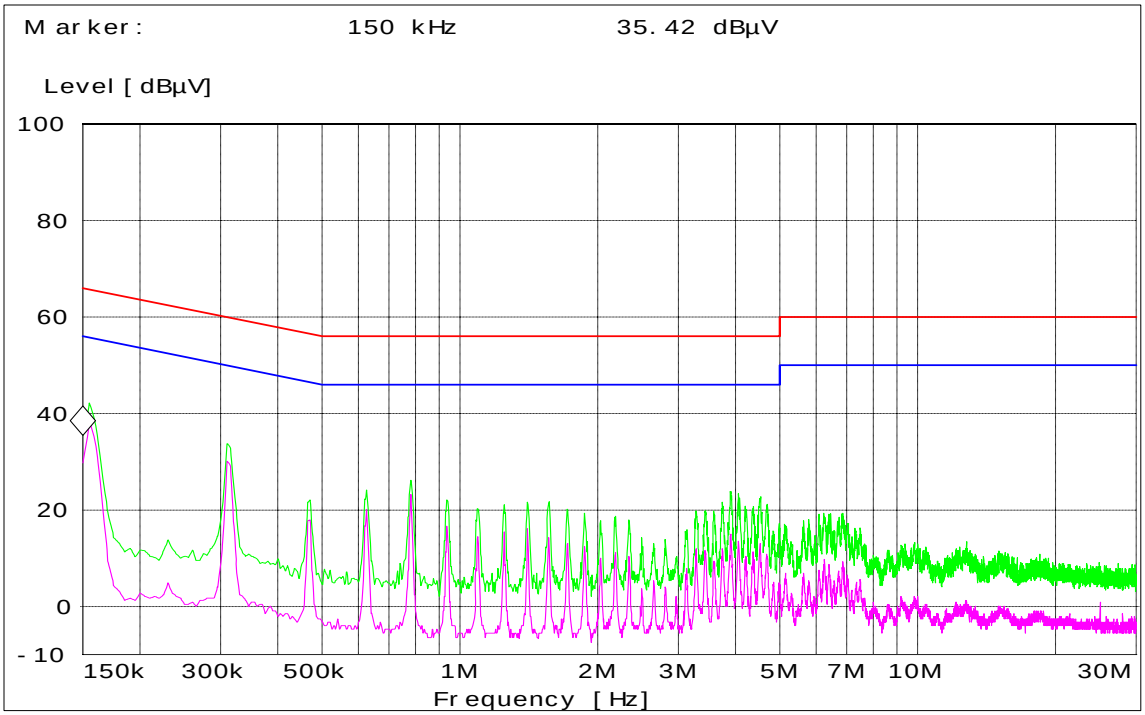
Bluetooth Channel 0 2402MHz - Tx Mode - Neutral Coupling Nonhopping



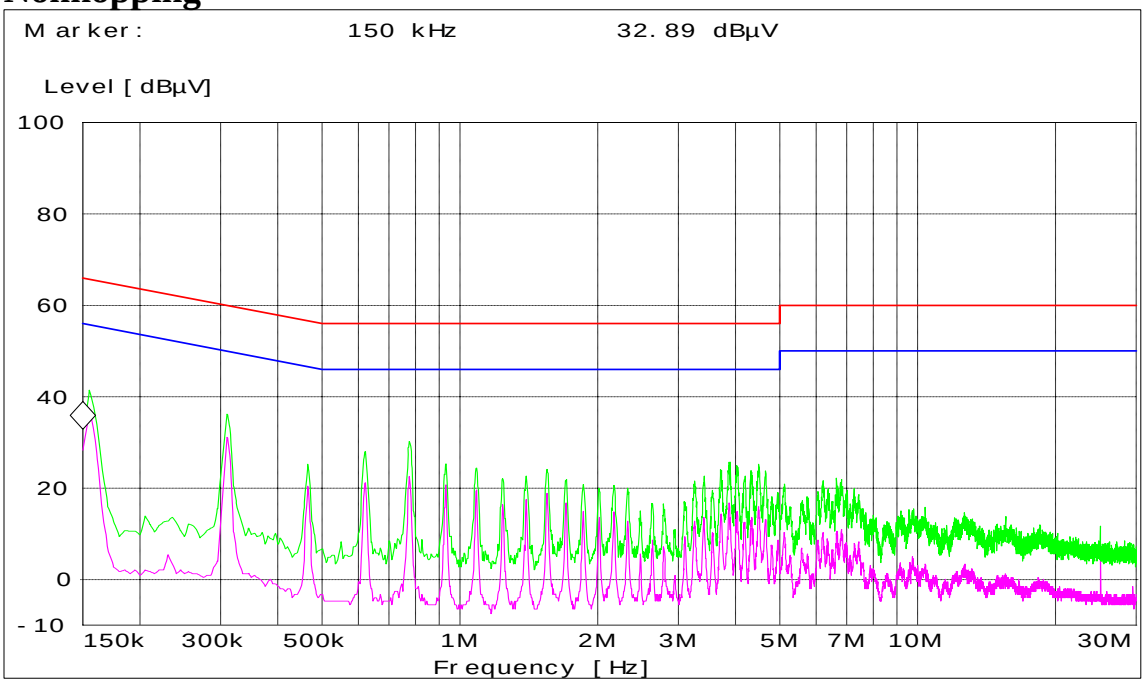
Bluetooth Channel 39 2441MHz - Tx Mode - Line Coupling Hopping



Bluetooth Channel 39 2441MHz - Tx Mode - Neutral Coupling Nonhopping



Bluetooth Channel 78 2480MHz - Tx Mode - Line Coupling Nonhopping



Bluetooth Channel 78 2480MHz - Tx Mode - Neutral Coupling Nonhopping

End of Test Report