UL International EMC Services
333 Pfingsten Road
Northbrook, Illinois 60062-2096
(800) 873-8536
Fax No. (847) 272-8864
http://www.ul.com/hitech/emc/

June 11, 2007

Motorola Inc.
Attn: Mr. Doug Hammers
600 N. US HWY 45
Libertyville, IL 60048
US

UL Reference: File MC15003, Project 07CA28509

Subject: EMC Test and Measurement Report for
Cell Phone 20596-1, FCC ID - IHDP56HE1.

Dear Mr. Hammers:

We have provided with this letter your EMC Test Report for the above referenced model. The product was determined to comply with the requirements noted in the report.

Please review the attached report and direct any questions or comments to me.

We appreciate your interest in UL's EMC Services, and encourage you to contact us in the future should you need EMC test services. This closes Project 07CA28509.

Best regards,

Lou Madjarov (Ext 43957)
EMC Sr. Project Engineer
International EMC Services

Reviewed by:

Jack Steiner
Section Manager
International EMC Services

EMC – TEST REPORT

Issue Date: June 11, 2007

Ö **EMISSIONS**

IMMUNITY

Test Report File No.	:	MC15003
Project No.	:	07CA28509
Kind of Product	:	Bluetooth Cell Phone
Applicant	:	Motorola Inc.
License Holder	:	Motorola Inc.
Address	:	600 N. US HWY 45
	:	Libertyville, IL 60048
	:	US
Manufacturer	:	Same as Applicant
	:	
Test Result	:	**COMPLIANT**

This report without appendices consists of 10 pages. Appendix A contains test photos, Appendix B contains original test data, Appendix C contains dwell measurement and Appendix D contains operating instructions provided by the manufacturer. The data contained in this report reflects only the items tested in the configurations and mode of operations described. An attempt has been made to arrange the EUT, with the equipment provided, into a test configuration which maximizes the observed emissions of the EUT while simulating, as close as practical, a typical end-use installation.

Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062
Fax: (847) 272-8864

REPORT DIRECTORY

SECTION TITLE

1.0 GENERAL PRODUCT DESCRIPTION

The equipment under test (EUT) is a BlueTooth cell phone 20596-1, FCC ID - IHDP56HE1.
.

1.0.1 Equipment Mobility:

Hand-held

1.0.2 Test Voltage and Frequency:

Voltage (V)	Frequency (Hz)
Cell phone battery	DC

1.1 MODEL DIFFERENCES

Any other model(s) represented by the models tested in this investigation will be documented by the manufacturer.

1.2 ENVIRONMENTAL CONDITIONS IN TEST LAB

Temperature:	**20-25 °C**
Relative Humidity:	**30-60% RH**
Atmospheric Pressure:	**860-1060 mbar**

1.3 CALIBRATION OF EQUIPMENT USED FOR MEASUREMENT

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST), therefore, all test data recorded in this report is traceable to NIST.

Equipment Calibration Data

Manufacturer Name	Item Name Description	Model #	Serial Number	Calibration Date	Calibration Due Date
Hewlett Packard	QP Adapter	85650A	2811A01069	01/05/07	01/05/08
Hewlett Packard	S/A Display	8566B	2542A12974	01/05/07	01/05/08
Hewlett Packard	S/A	8566B	2637A03376	01/05/07	01/05/08
Rohde & Schwartz	S/A	FSEK20	DE2525315	01/04/07	01/04/08
Chase	Bi-Con Antenna 30-300MHz	VBA6106A	1246	08/15/06	08/15/07
Schaffner	Log-Periodic Antenna	6109	22987	08/19/06	08/19/07
EMCO	Horn Antenna 1-18GHz	3115	2638	08/09/06	08/09/07
EMCO	Horn Antenna 2-4GHz	3161-02	9906-1052	N/A	N/A
EMCO	Horn Antenna 4-8GHz	3161-03	9905-1041	N/A	N/A
EMCO	Horn Antenna 8-12GHz	3160-07	9902-1114	N/A	N/A
EMCO	Horn Antenna 12-18GHz	3160-08	9904-1100	N/A	N/A
EMCO	Horn Antenna 18-26.5GHz	3160-09	990345-003	N/A	N/A

1.4 EUT CONFIGURATION(s)

See Appendix A for individual set-up configuration(s). In addition to the EUT, the following peripheral devices and/or cables were connected during the measurement:

Phone was tested in battery mode only. No external cables (USB, Headphone or Charger) were attached per manufacturer's request.

Device	Manufacturer	Submission #	Serial #	FCC ID
EUT	Motorola Corp	20596-1	-	IHDP56HE1

1.5 EUT OPERATING MODE(s)

The equipment under test was operated during the measurements under the following conditions:

- Per manufacturer's request tests were performed in the Bluetooth mode only. See Appendix C for manufacturer's provided instructions for configuring the phone to operate in this mode.
- Tests were performed at low, mid and high channels.
- Tests were performed with EUT orientated along X, Y and Z orthogonal axis.

1.6 DEVICE MODIFICATIONS

The following modifications were necessary for compliance:

None

2.0 EMISSIONS TEST REGULATIONS

The following test were performed according to the following regulations:

- The **spurious radiated emission** requirements of paragraph **15.247(d) of CFR47 Part 15 2006**, specifically ”radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

- Under this project only 30 to 1000MHz, 1 to 25GHz and band-edge measurements were performed.

- Additional guidance was obtained from FCC Document, DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems Released March 30, 2000

RADIATED ELECTRIC FIELD EMISSIONS, 30 TO 1000MHz

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure
Northbrook Work Instruction for Measurement of Radiated Emissions (EMC)
08-CA-W0030

Test Instruments

Spectrum Analyzer / Quasi-peak Adapter / Preamplifier

Hewlett Packard Model 8566B Spectrum Analyzer	EMC4085
Model 85650A Quasi-peak Adapter	EMC4016
Miteq AM-3A-000110-N Preamp	EMC4151

Antennas

Chase EMC Ltd., Biconical Antenna Model VBA6106A	S/N 1246
Schaffner, Log Periodic Antenna Model 6109	S/N 22987

Frequency Range of Measurement
30MHz-1000MHz

Measurement Distance

10 meters

Test Results

The requirements are:
MET

Remarks

See App. B for complete test results.

RADIATED ELECTRIC FIELD EMISSIONS, 1 TO 25 GHz
BAND-EDGE MEASUREMENTS

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

Northbrook Work Instruction for Measurement of Radiated Emissions (EMC)
08-CA-W0030

Test Instruments

Spectrum Analyzer

Rhode & Schwarz, Spectrum Analyzer, 9kHz-40GHz, EMC 4182
UL BOMS Signal Path

Antennas

Emco	Double-Ridge Guide Horn	3115	2638
Emco	Horn Antenna 2-4GHz	3161-02	9906-1052
Emco	Horn Antenna 4-8GHz	3161-03	9905-1041
Emco	Horn Antenna 8-12GHz	3160-07	9902-1114
Emco	Horn Antenna 12-18GHz	3160-08	9904-1100
Emco	Horn Antenna 18-26.5GHz	3160-09	990345-003

Frequency Range of Measurement
1 to 25 GHz

Measurement Distance
3 meters

Test Results

The requirements are:
MET

Remarks
See App. B for complete test results.

Preliminary peak scans were performed in low, mid and high channels as well as with EUT configured along X, Y and Z orthogonal axis. Final maximized (azimuth and height) measurements were then performed under worst-case configuration as determined during preliminary measurement (refer to final Average data, Appendix B).

3.0 IMMUNITY TEST REGULATIONS

Immunity testing was not performed per the request of the manufacturer nor required by CFR 47, Part 15.

4.0 GENERAL REMARKS

Sample Receipt Date : June 7, 2007

Test Dates

Start : June 7, 2007
End : June 9, 2007

4.1 SUMMARY

The requirements according to the technical regulations are:

MET

Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062 USA

Test Engineer:

Lou Madjarov (Ext 43957)
EMC Sr. Project Engineer
International EMC Services

Reviewed by:

Jack Steiner
Section Manager
International EMC Services

APPENDIX A

PHOTOS

For photo refer to
Appendix A, 20596-1, IHDP56HE1

Radiated Emissions
X-Axis

.

For photo refer to
Appendix A, 20596-1, IHDP56HE1

Radiated Emissions
Y-Axis

For photo refer to
Appendix A, 20596-1, IHDP56HE1

Radiated Emissions
Z-Axis

APPENDIX B

TEST DATA

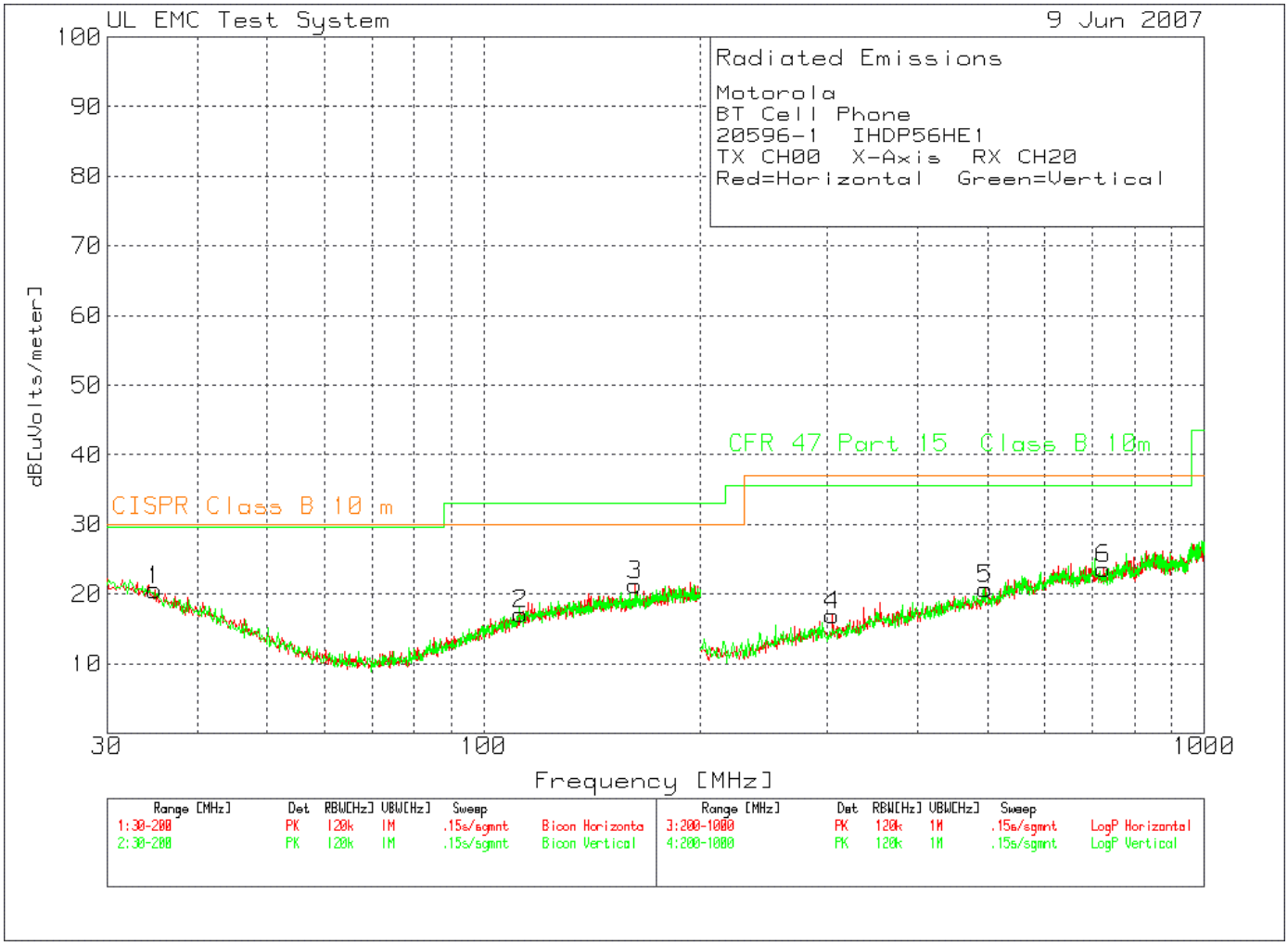
EMISSIONS

Radiated Electric Field Emissions

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

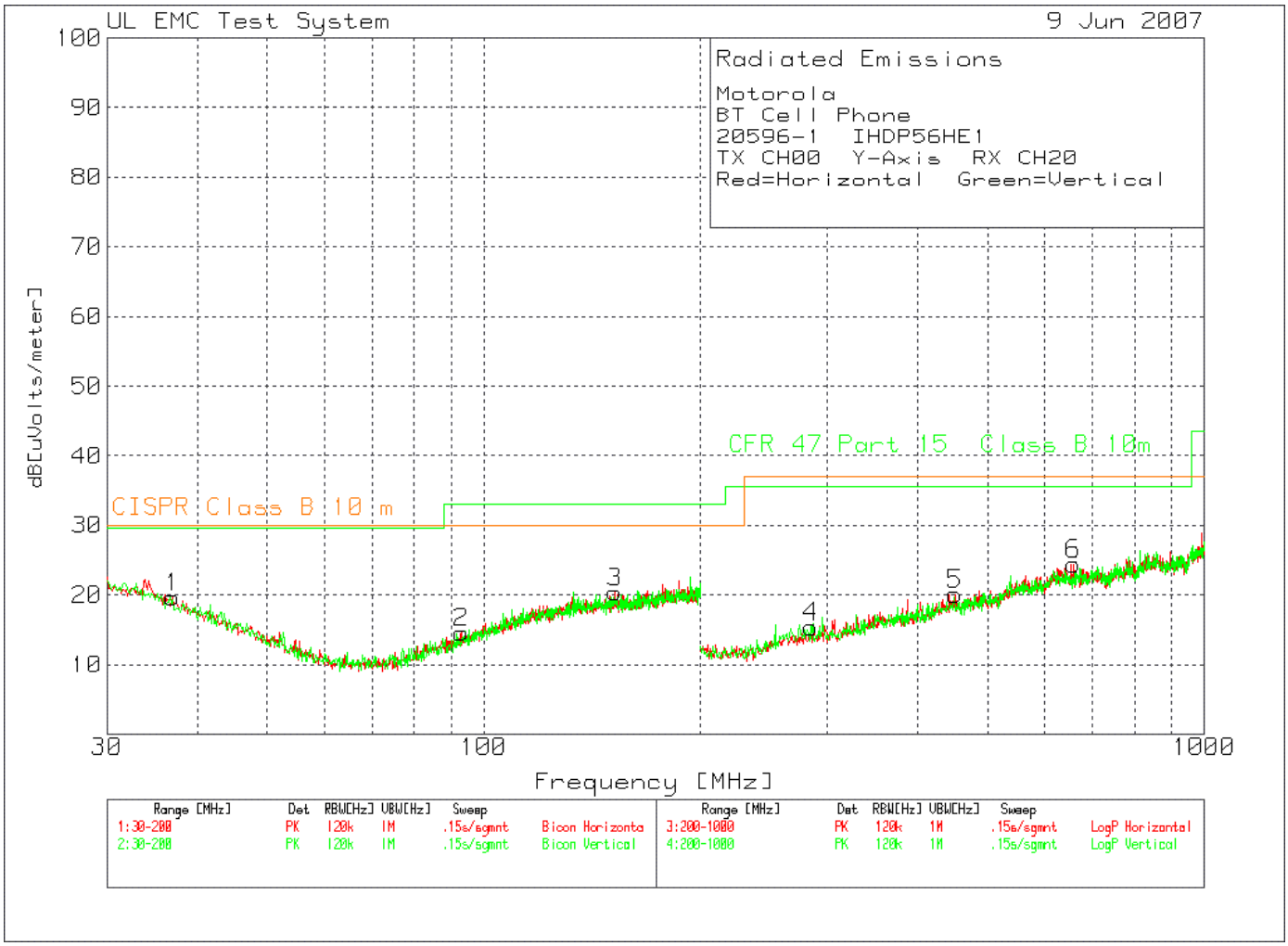
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	120 kHz
Measurement Distance	:	10 meter
Antenna Type	:	**30 - 300 MHz, Biconical** **300 - 1000 MHz, Log-Periodic**



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	120 kHz
Measurement Distance	:	10 meter
Antenna Type	:	**30 - 300 MHz, Biconical** **300 - 1000 MHz, Log-Periodic**



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
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Measurement Distance	:	10 meter
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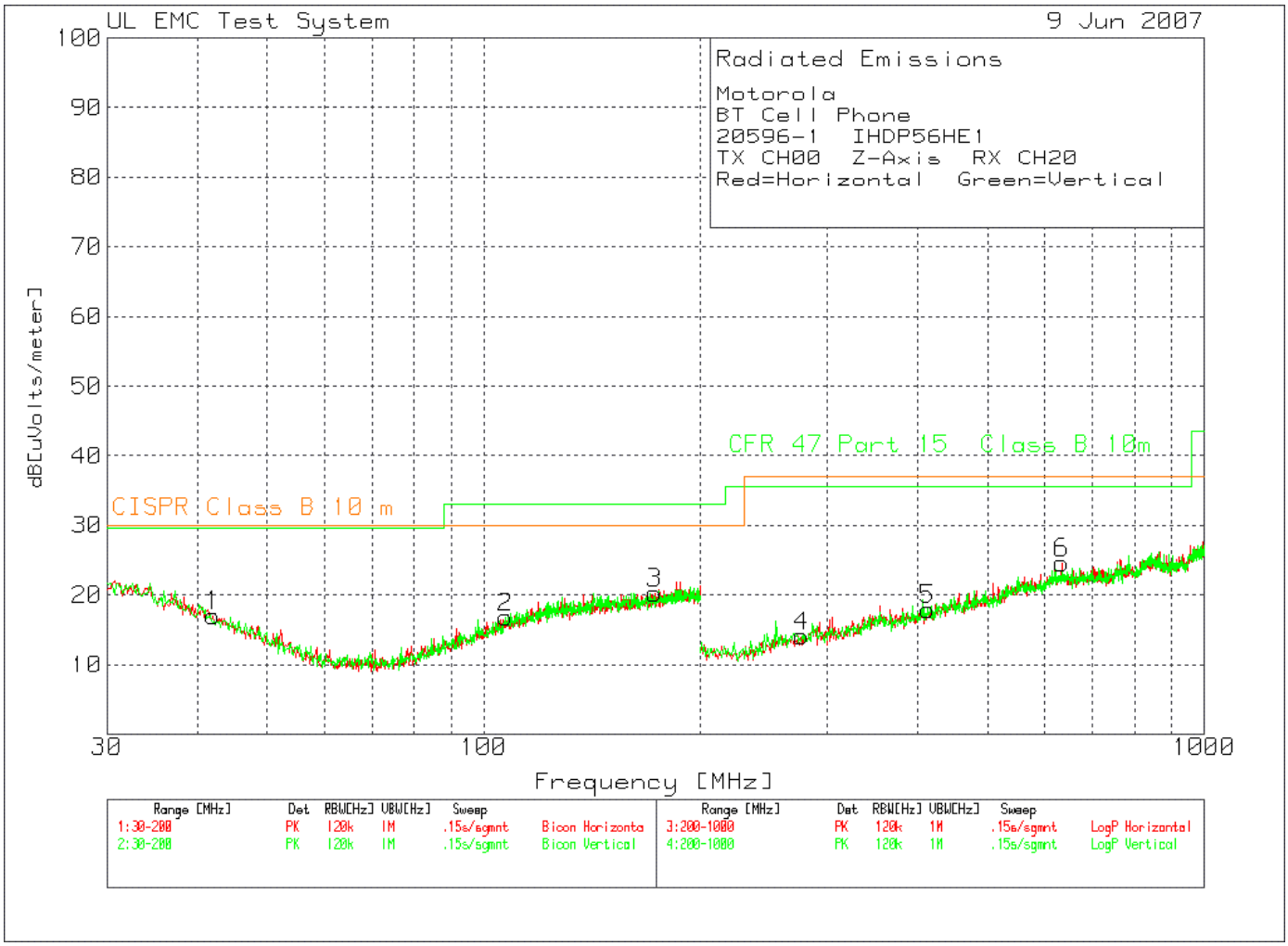

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	120 kHz
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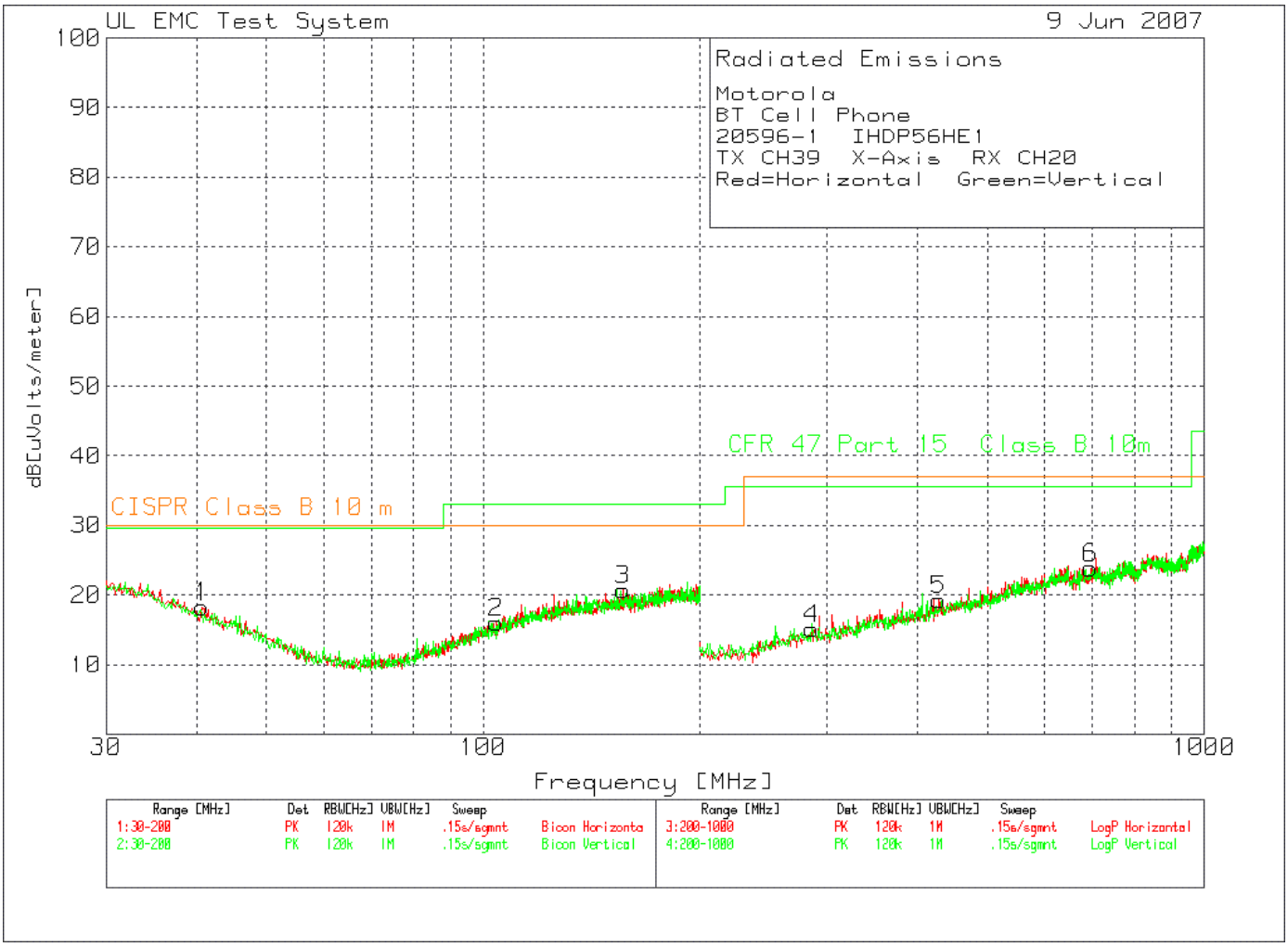

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
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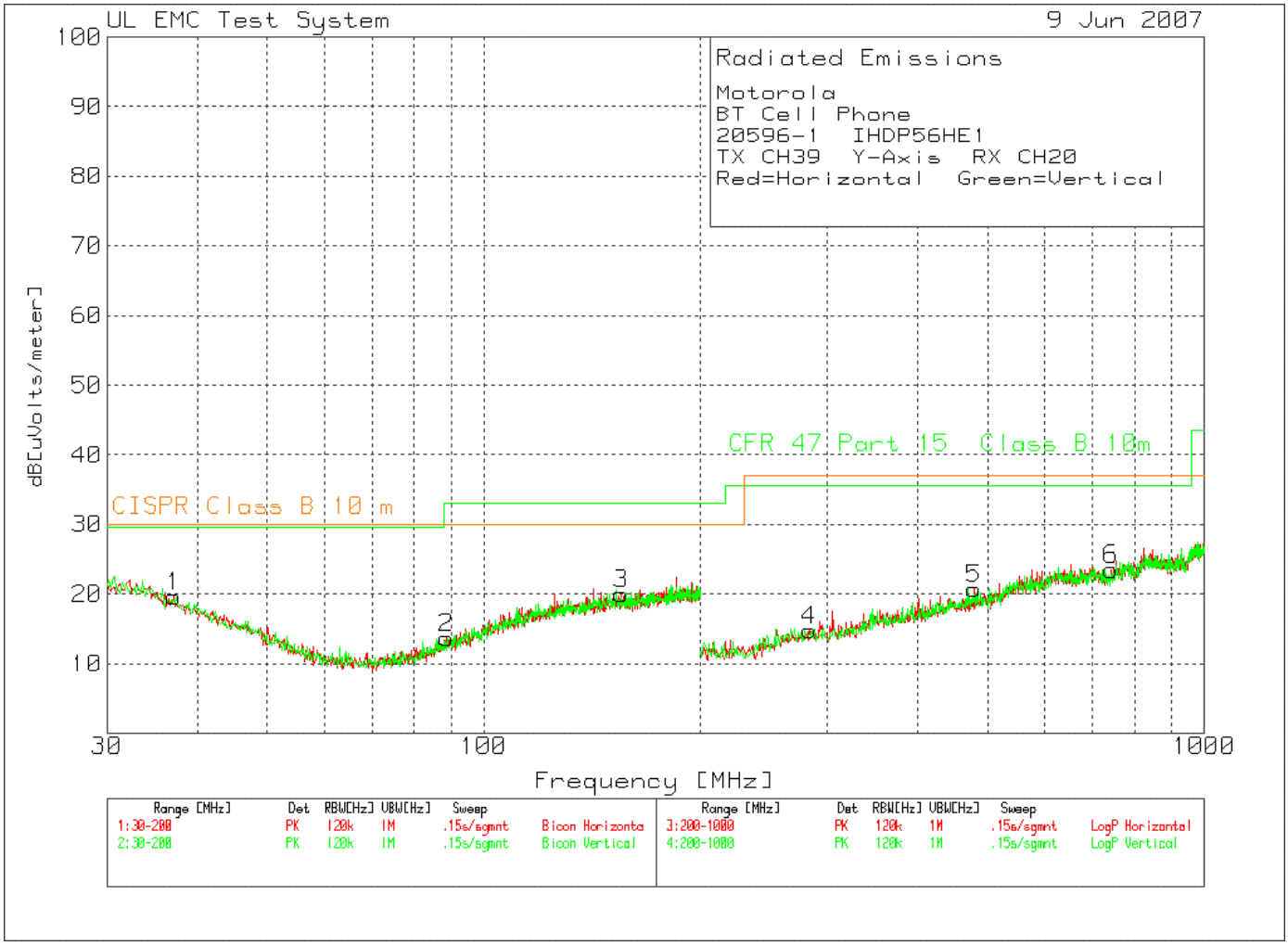

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
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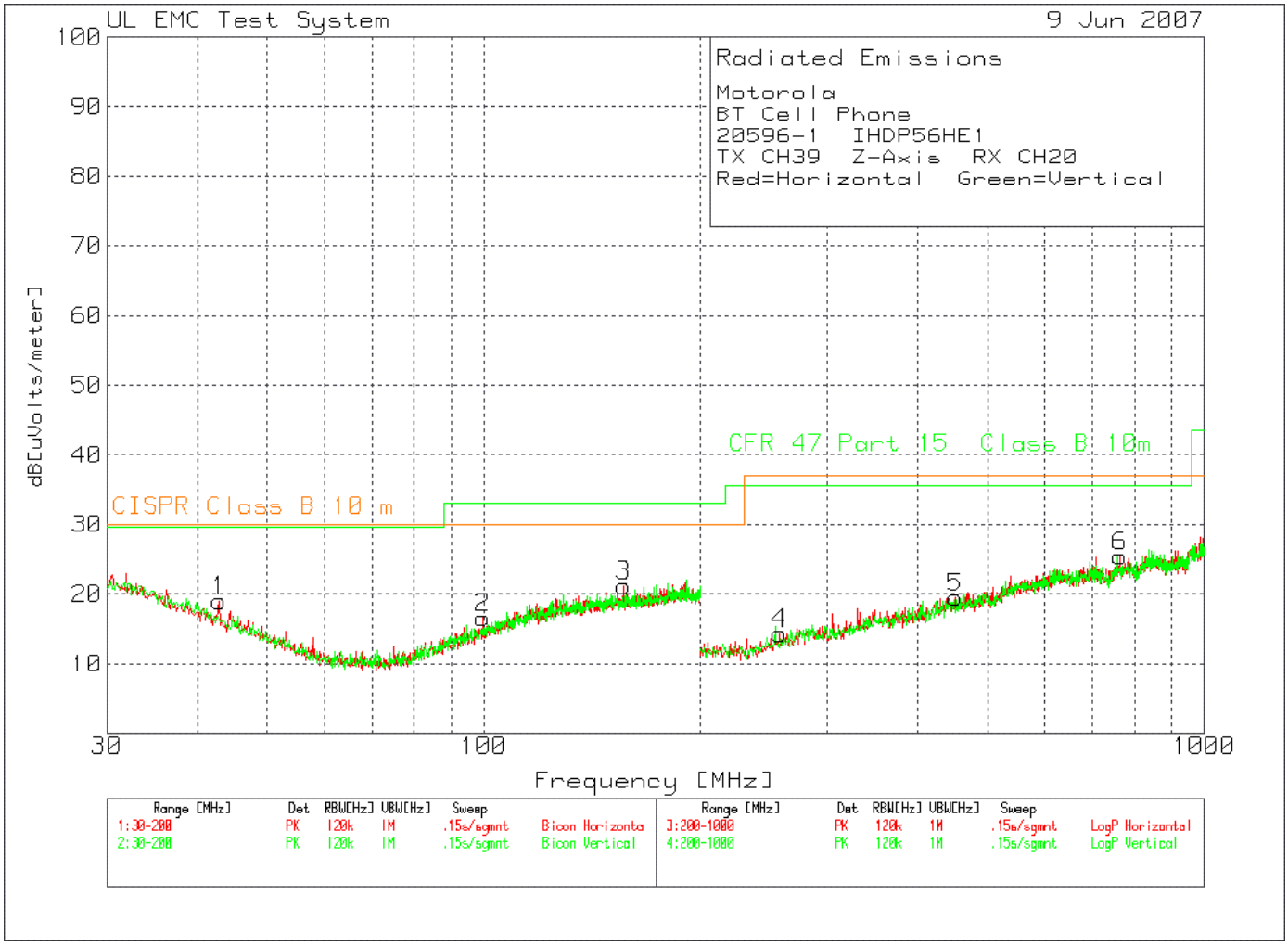

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
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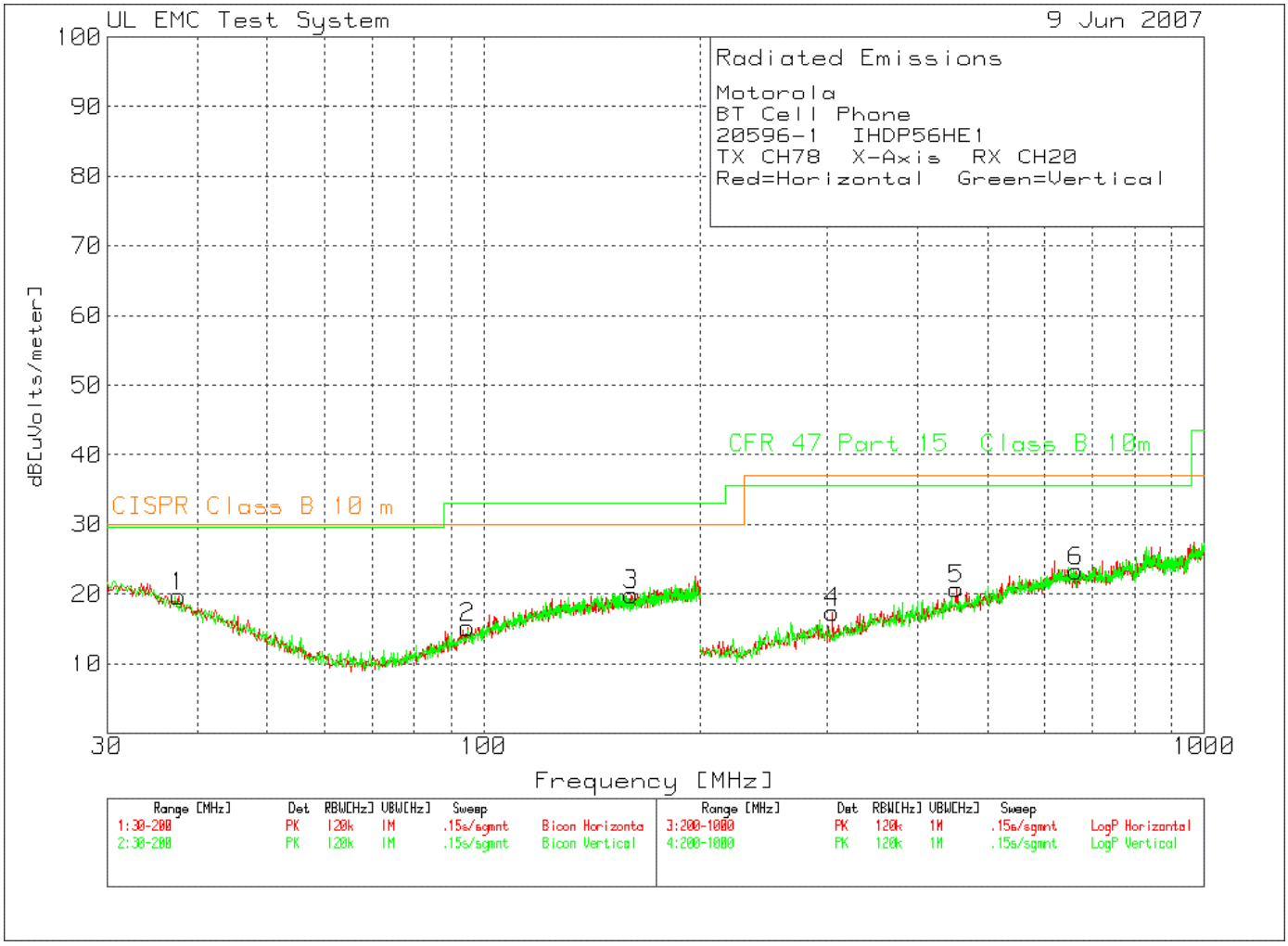

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
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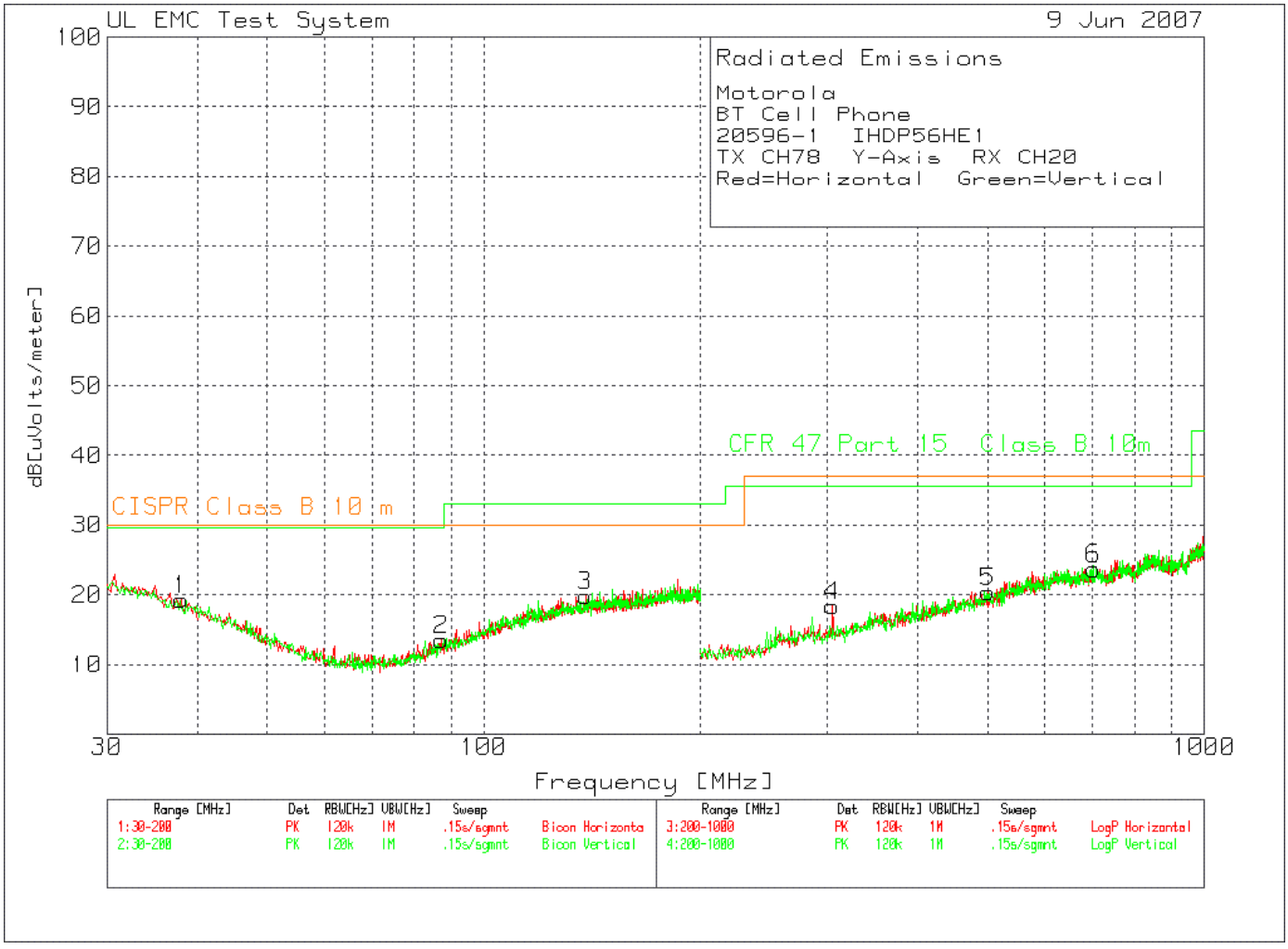

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

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Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
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Bandwidth	:	120 kHz
Measurement Distance	:	10 meter
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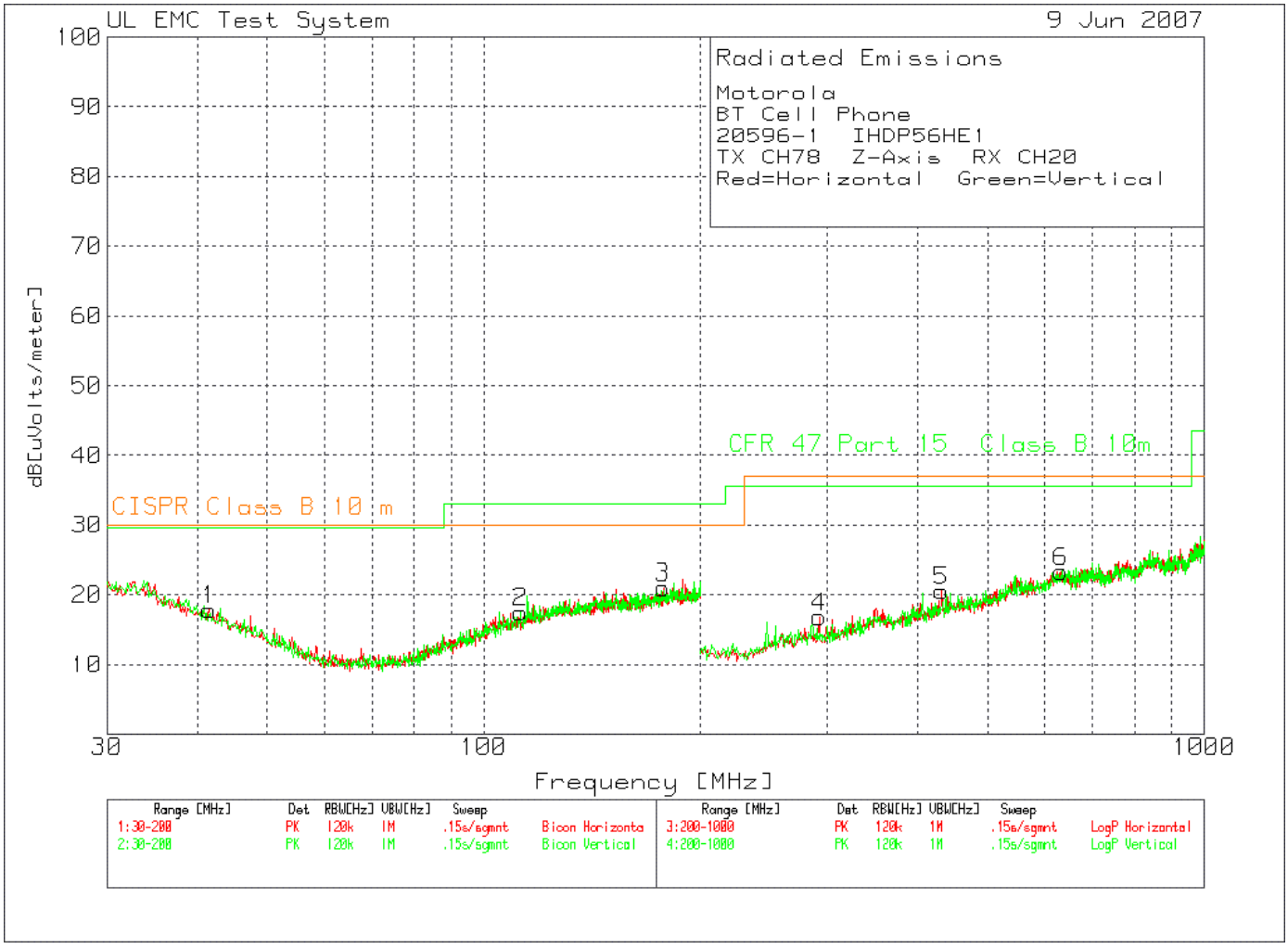
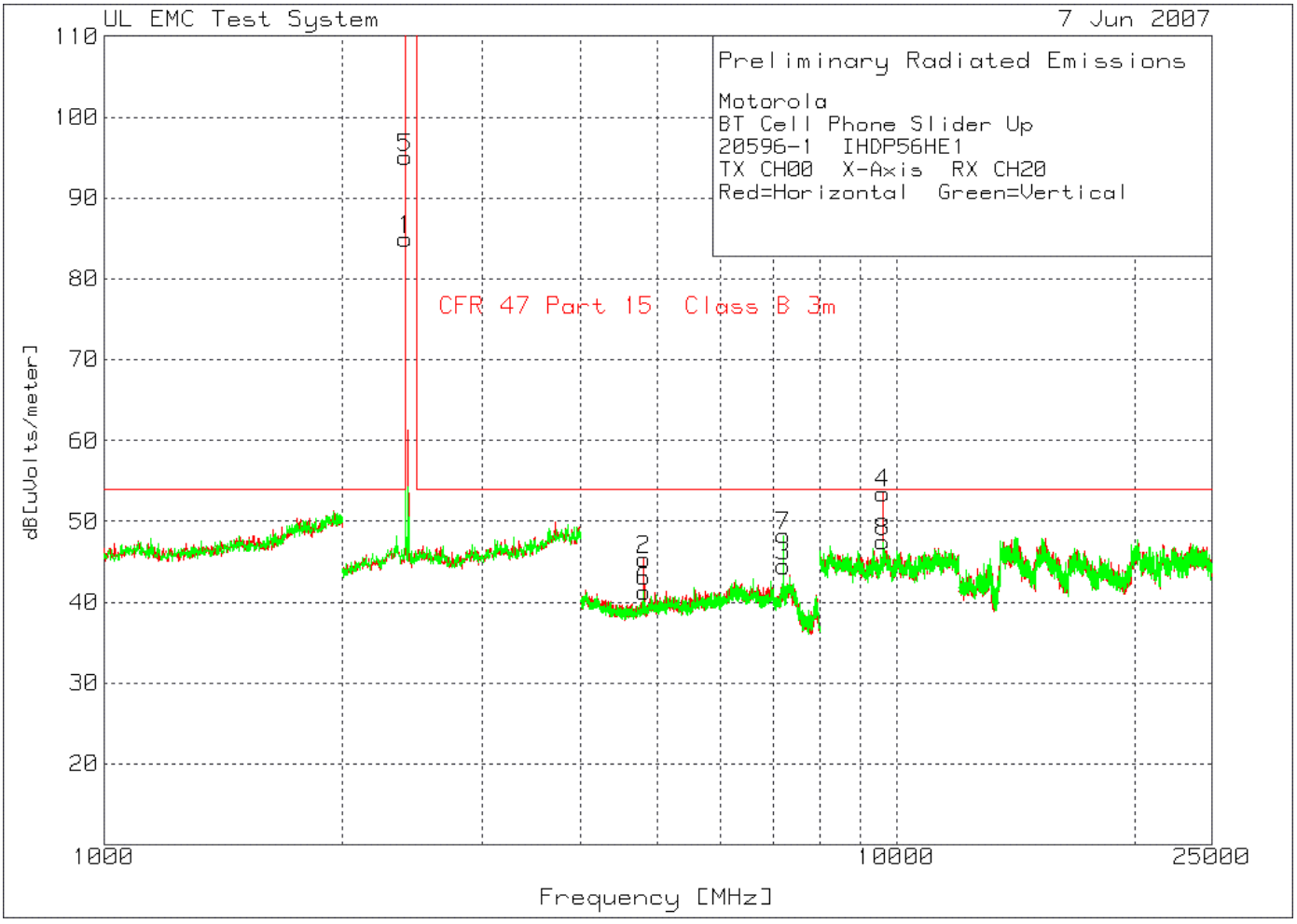


UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

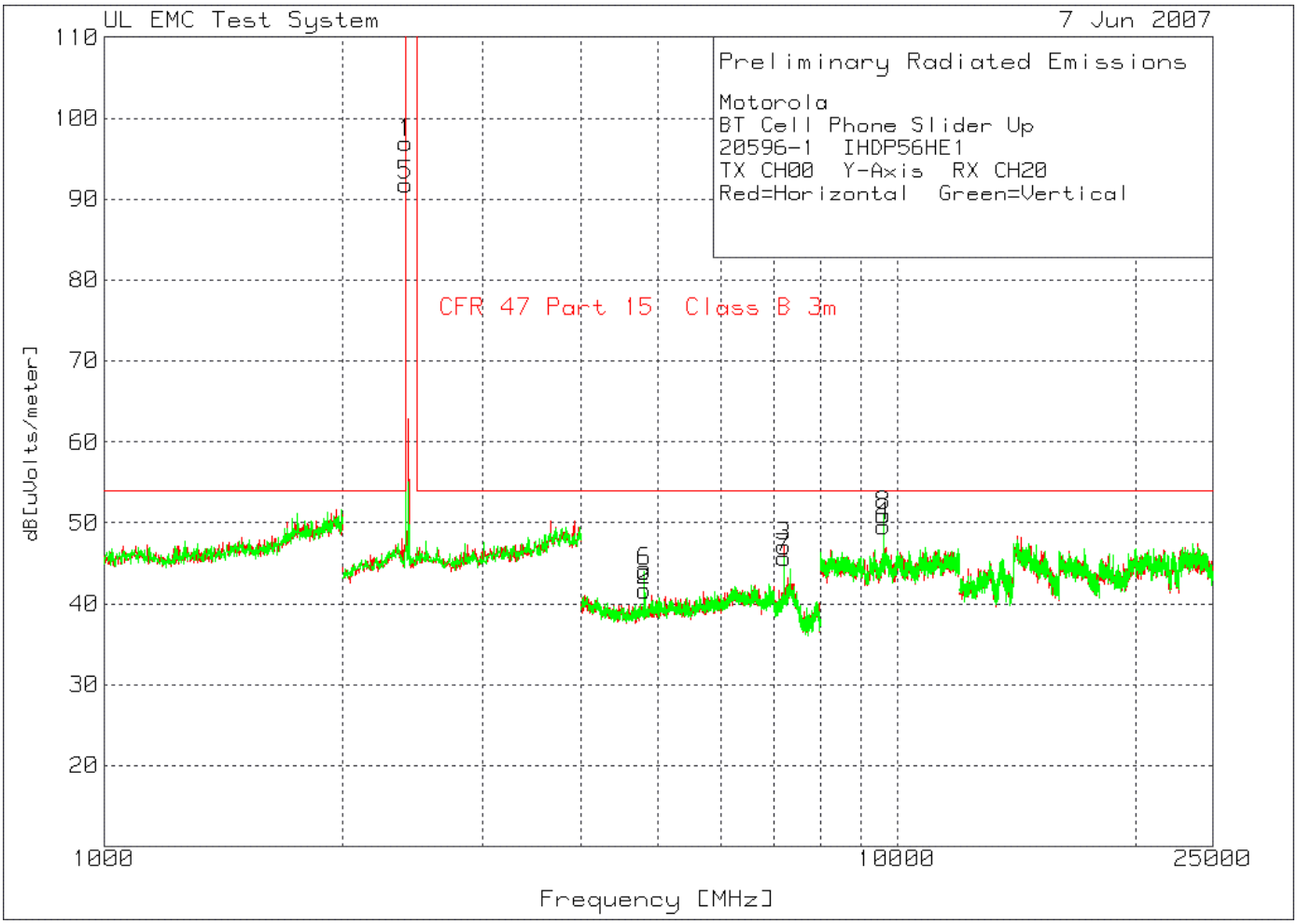
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

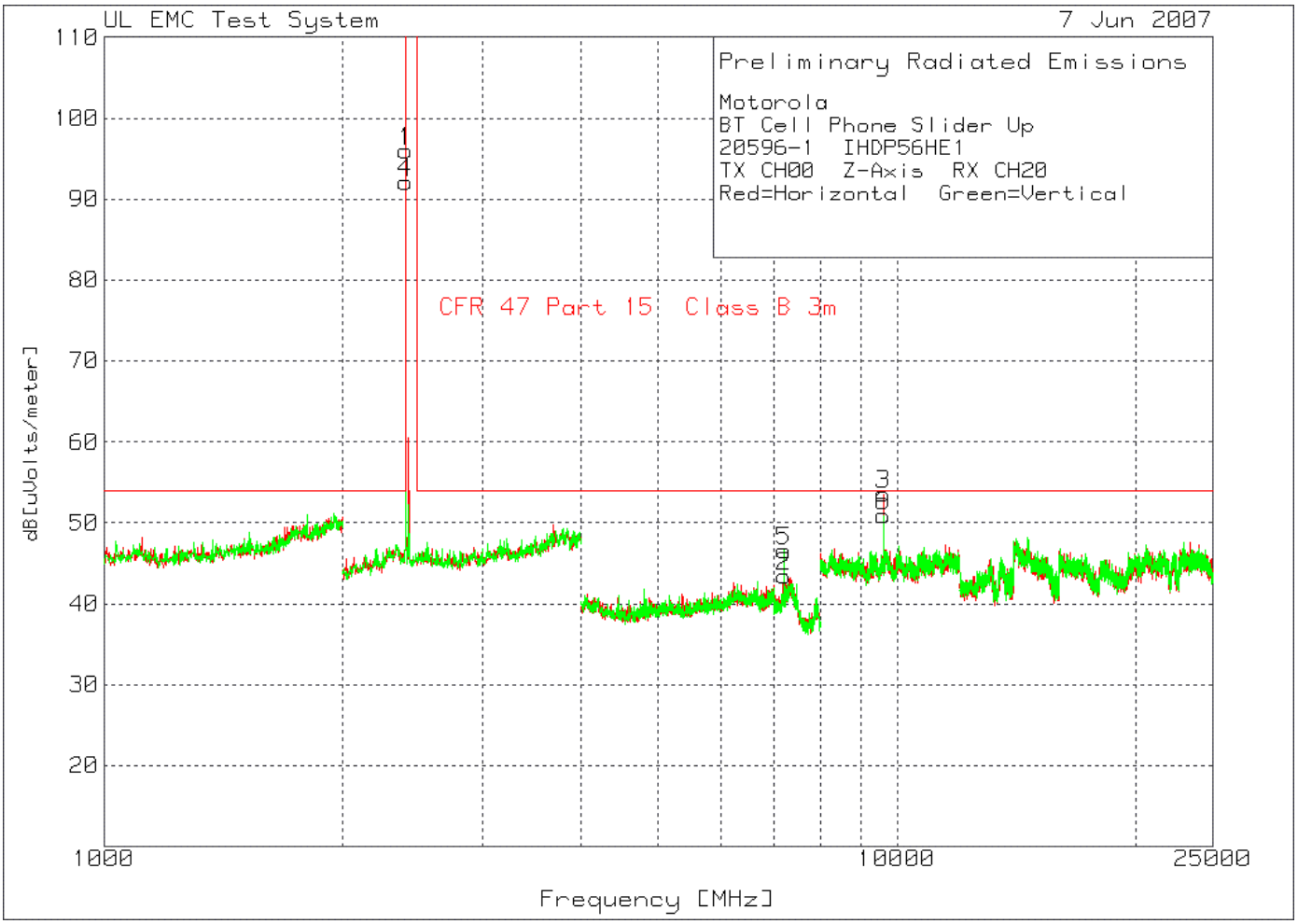
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

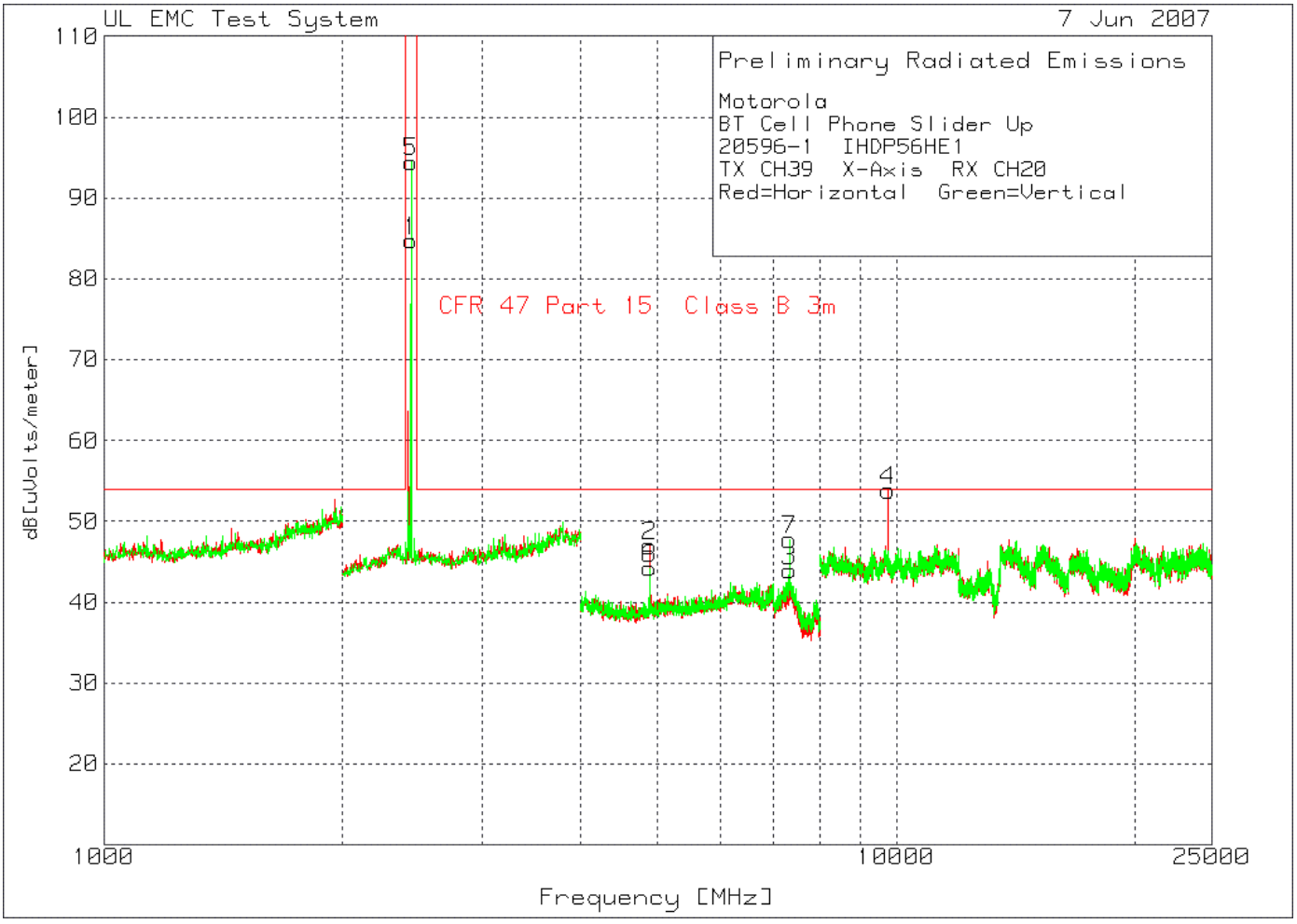
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
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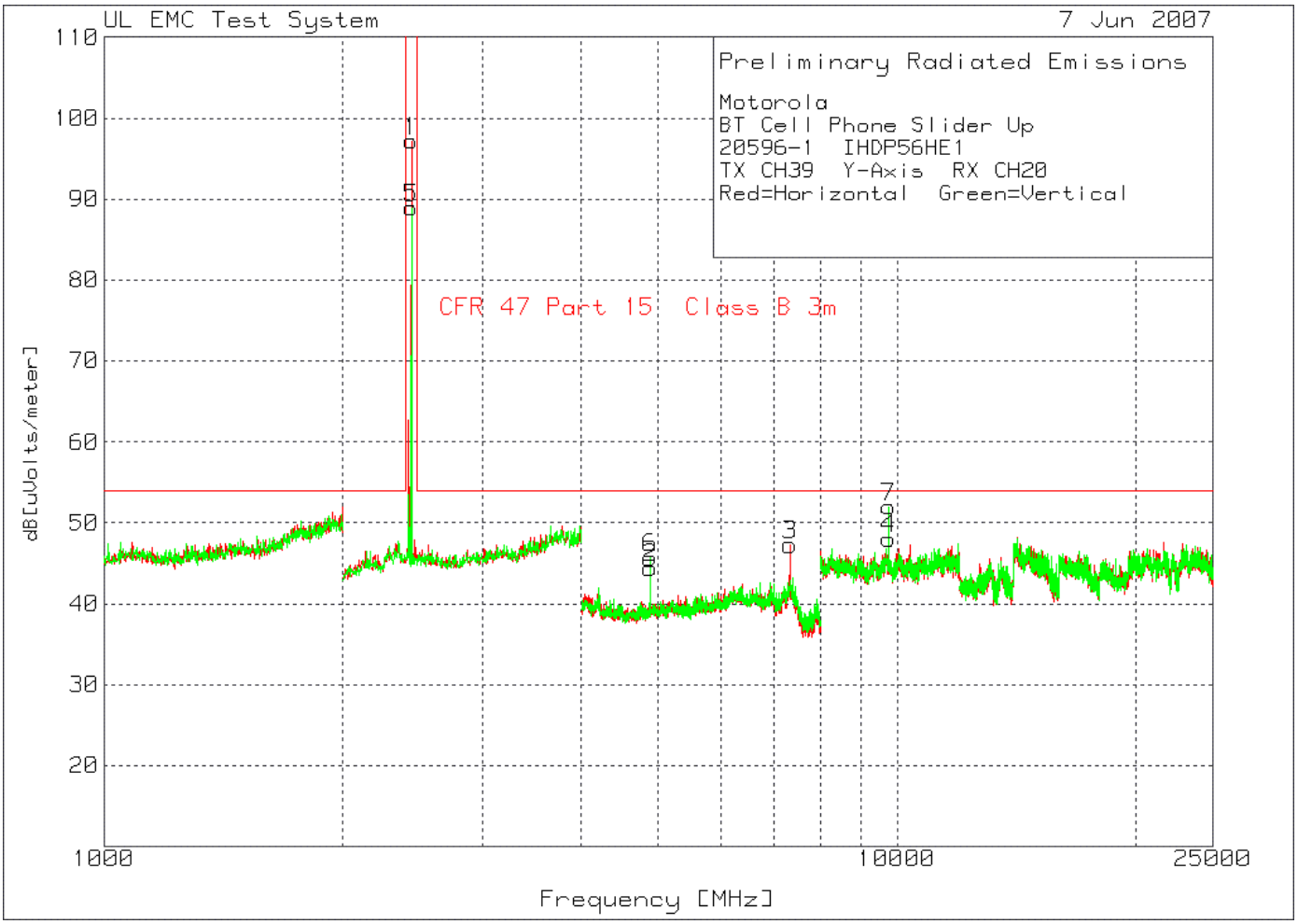
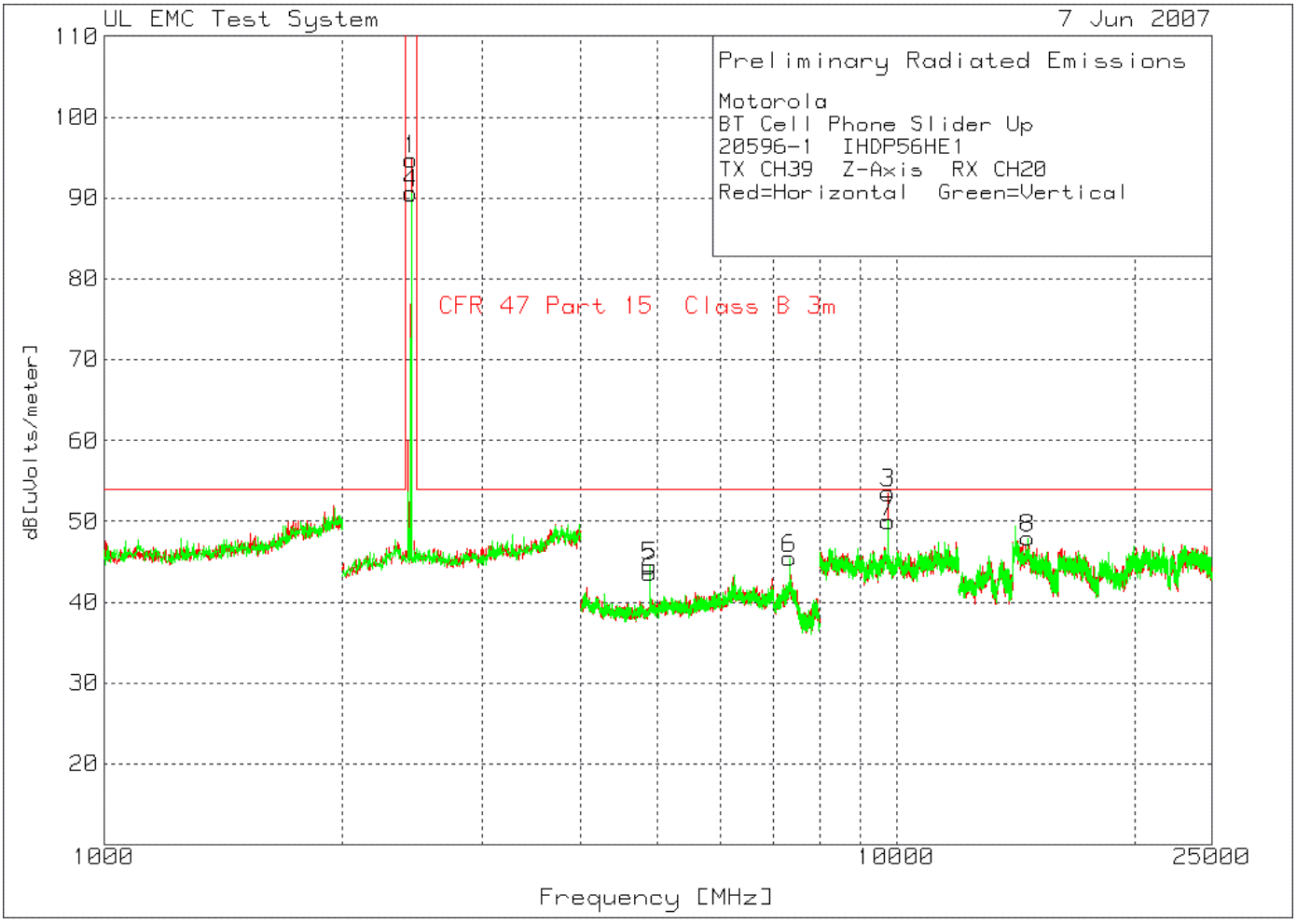


UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

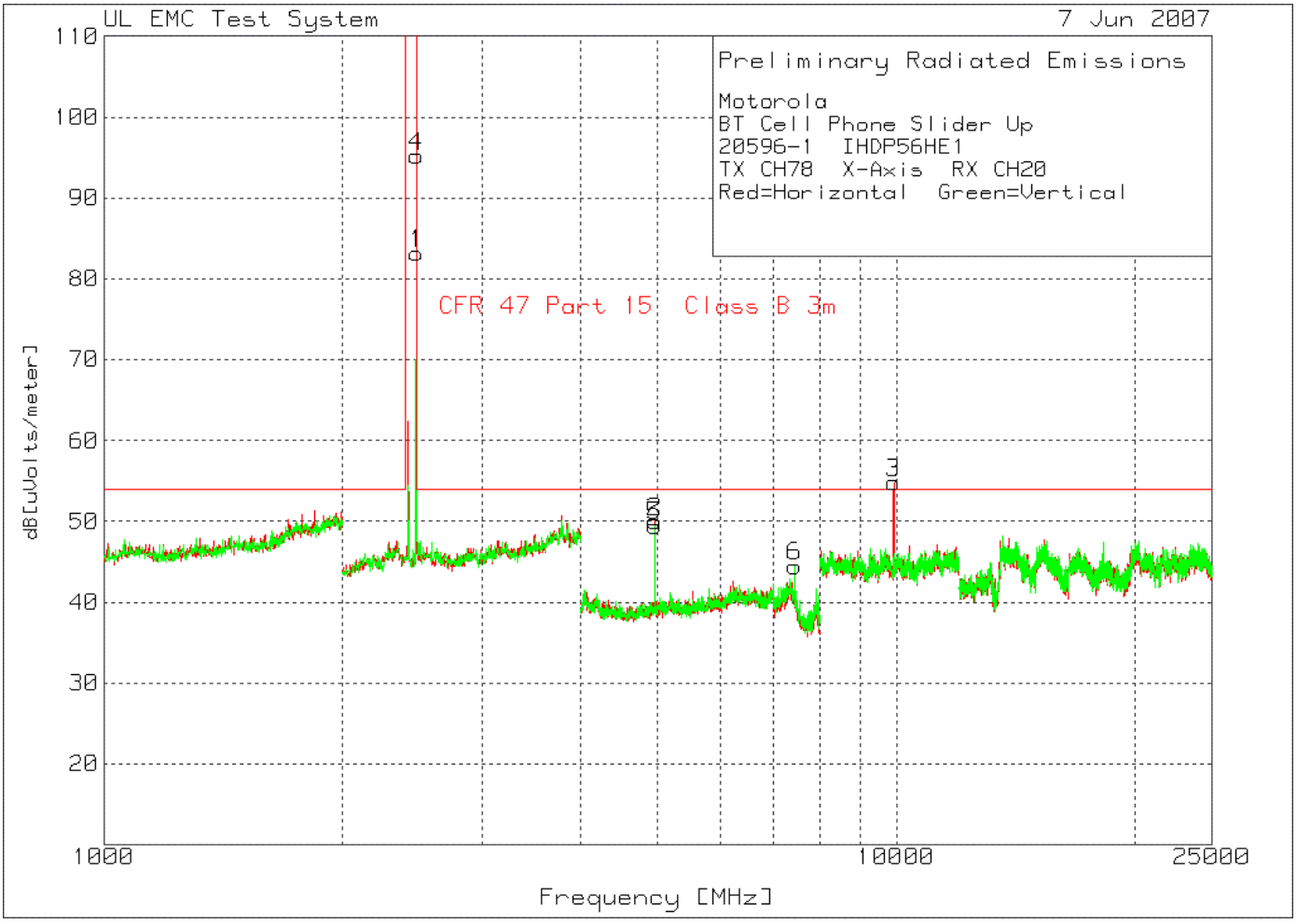
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

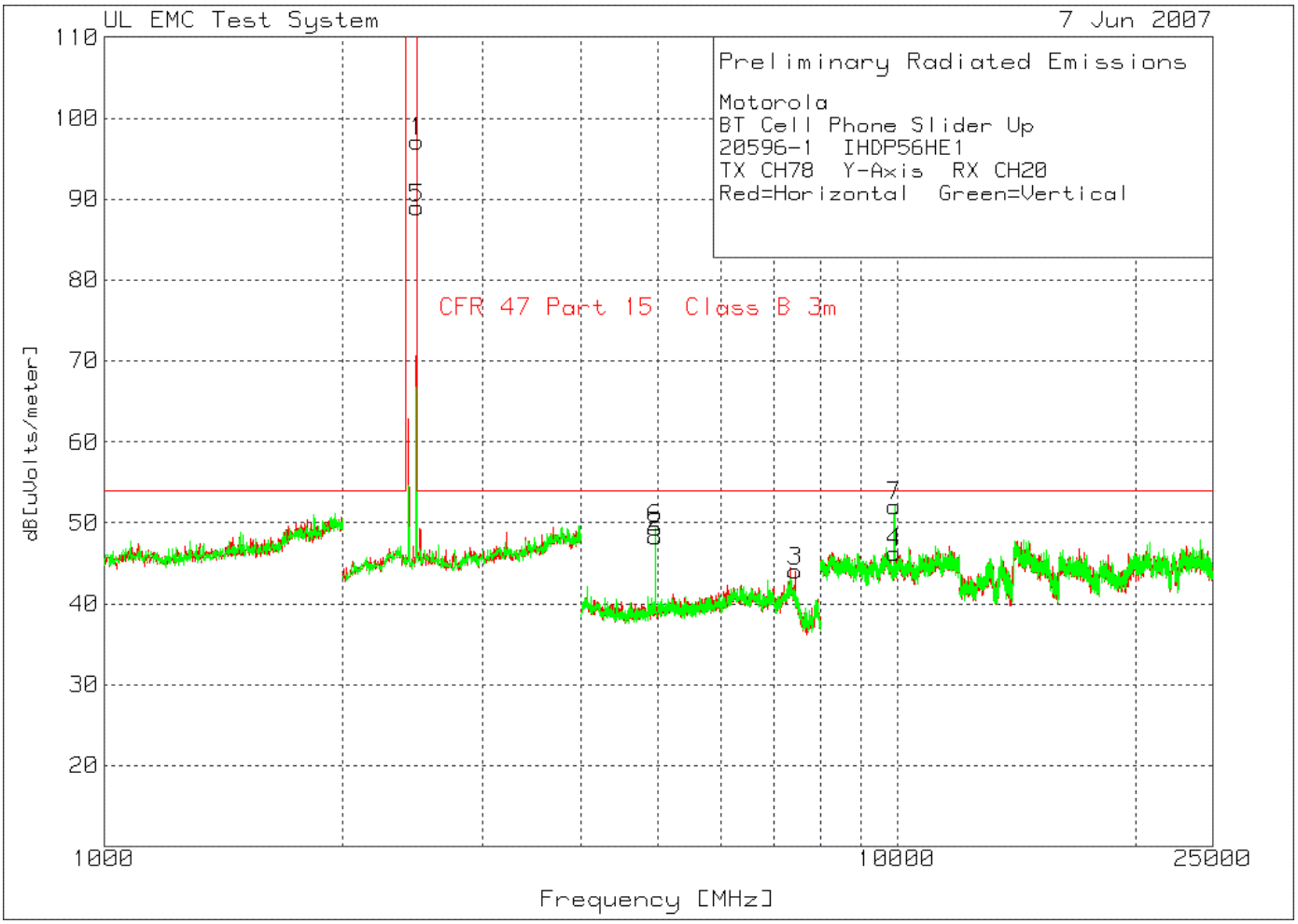
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

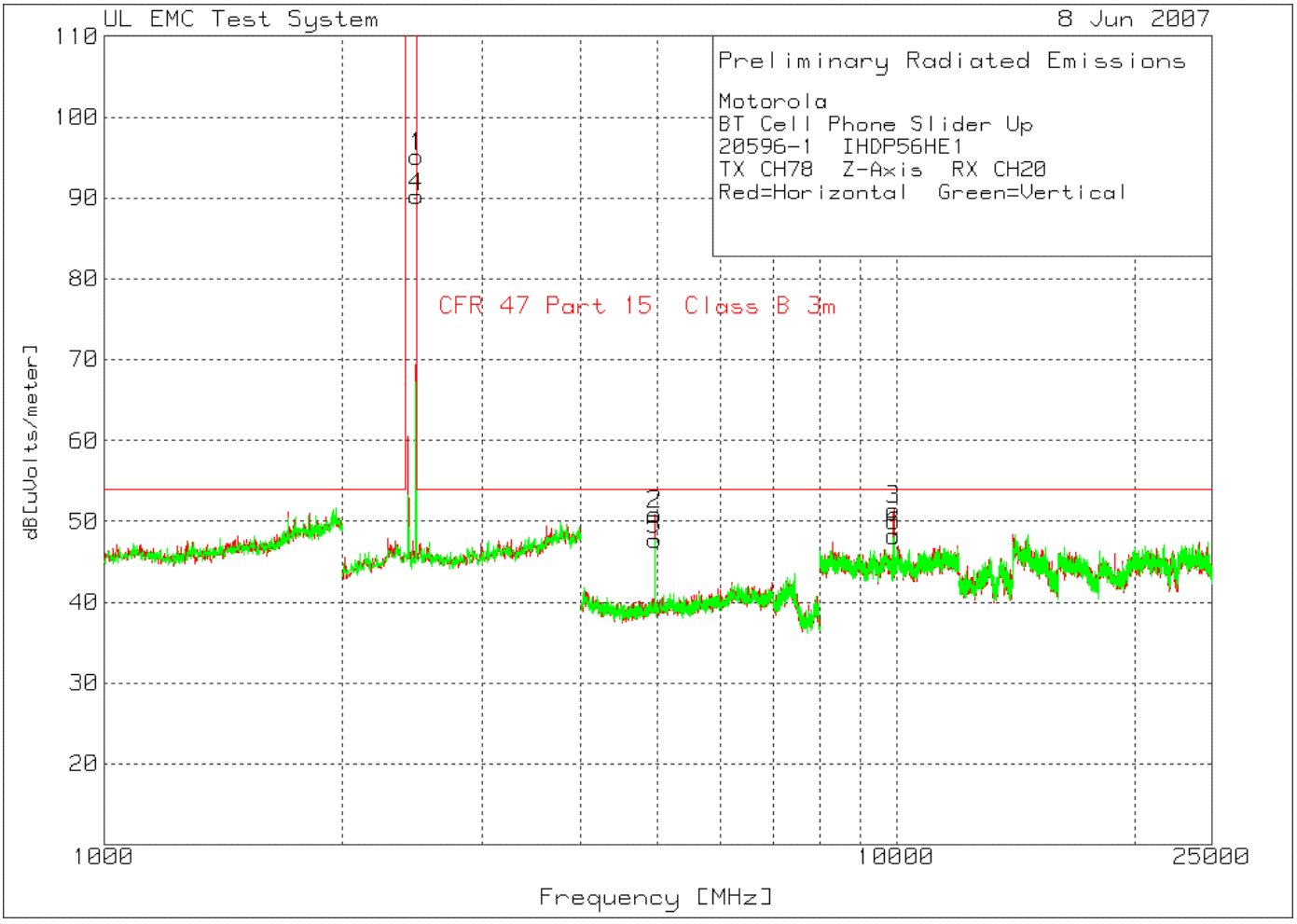
Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-8-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

Manufacturer : **Motorola Inc.**
Equipment Under Test : **20596-1 Cell Phone**
Requirement : **CFR 47 Part 15 Class B**
Detection Mode : Average (VBW=10Hz)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn

FINAL AVERAGE DATA

Channel	Axis	Test Frequency [MHz]	Meter Reading [dB(uV)]	Detector Type	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uV]	Limit	Margin 1[dB]	Azimuth [degs]	Height [cm]	Polarity	Duty Cycle Correction, See App C	Level dB[uV]	Margin 1[dB]	Compliance
0	X	9607.978	64.7	av	-50.26	36.4	50.84	54	**-3.16**	339	105	Horz	-30.75	20.09	-33.91	Pass
0	Z	9608.0261	61.91	av	-50.26	36.4	48.05	54	**-5.95**	238	142	Horz	-30.75	17.3	-36.7	Pass
39	X	9764.022	64.06	av	-50.39	36.4	50.07	54	**-3.93**	341	110	Horz	-30.75	19.32	-34.68	Pass
39	Z	9764.005	62.55	av	-50.39	36.4	48.56	54	**-5.44**	226	140	Horz	-30.75	17.81	-36.19	Pass
78	X	9920.0842	63.78	av	-50.6	36.4	49.58	54	**-4.42**	337	102	Horz	-30.75	18.83	-35.17	Pass

Preliminary peak scans were performed in low, mid and high channels as well as with EUT configured along X, Y and Z orthogonal axis. Final maximized (azimuth and height) measurements were then performed under worst case configuration as determined during preliminary measurement.

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-7-2007

Manufacturer	**:**	**Motorola Inc.**
Equipment Under Test	**:**	**20596-1 Cell Phone**
Requirement	**:**	**CFR 47 Part 15 Class B**
Detection Mode	**:**	Average (VBW=10Hz)
Bandwidth	**:**	1 MHz
Measurement Distance	**:**	3 meter
Antenna Type	**:**	1-25GHz Horn

FINAL AVERAGE DATA

Preliminary peak scans were performed in low, mid and high channels as well as with EUT configured along X, Y and Z orthogonal axis.

Per clause 15.35 of CFR 47, Part 15 and DA 00-705, the measured field strength was determined by averaging the pulse train over a 0.1 second interval.

Per data provided by the manufacturer the EUT's measured dwell time is 2.9 ms and based on the fact that the same channel will not be reused within 100 ms period, the average value of measured emissions is calculated as follows:

2.9 ms / 100ms = 0.029

20log (0.029) = -30.75dB

When the calculated relaxation is applied to the measured field strength the levels were well below the limit.

See Appendix C for Dwell Time measurement provided by the manufacturer.

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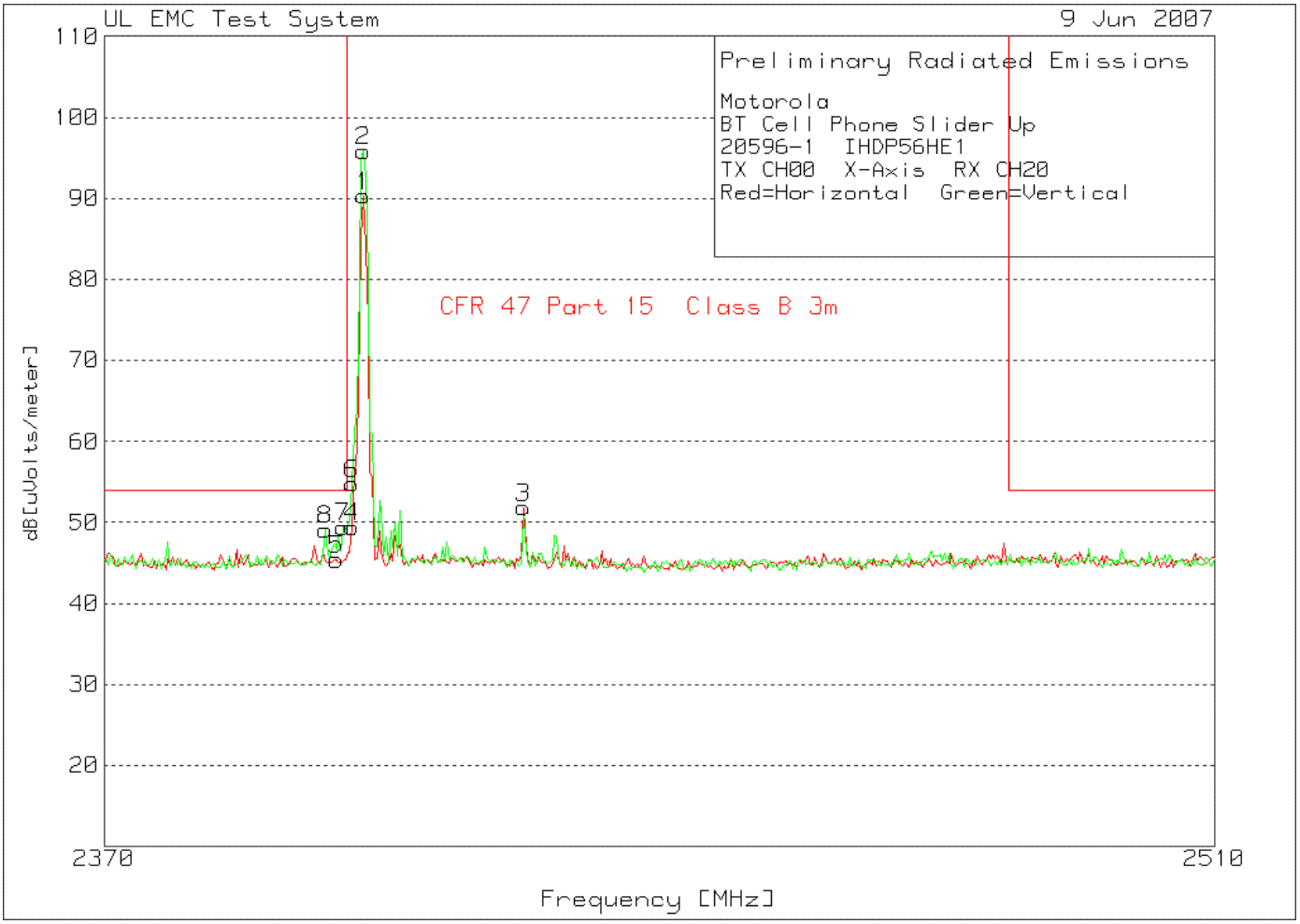
UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone (Inband)**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	2-4GHz Horn



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Radiated Emissions

Date Tested: 6-9-2007

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Equipment Under Test	:	**20596-1 Cell Phone (Inband)**
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Detection Mode	:	Peak (pk)
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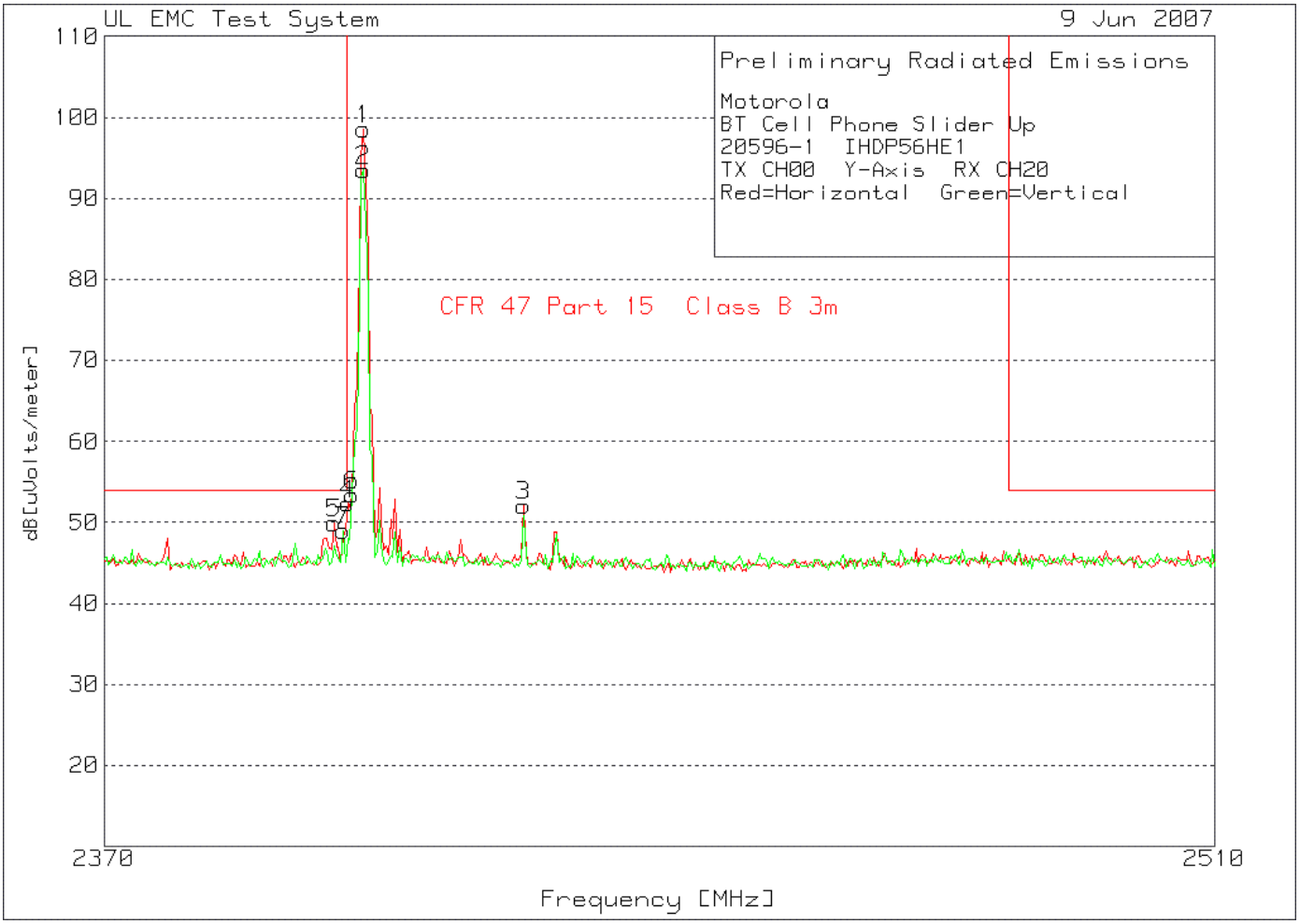

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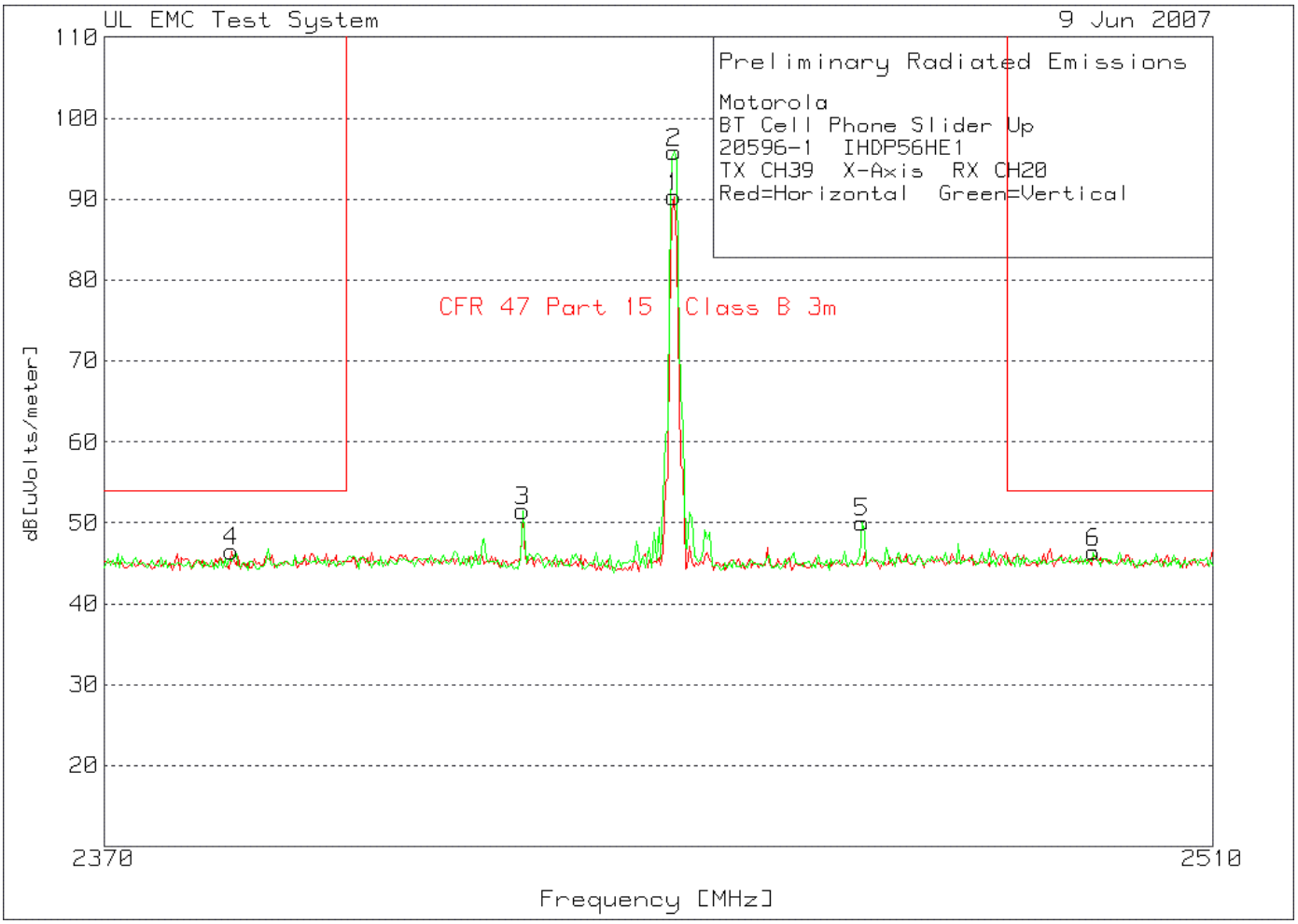

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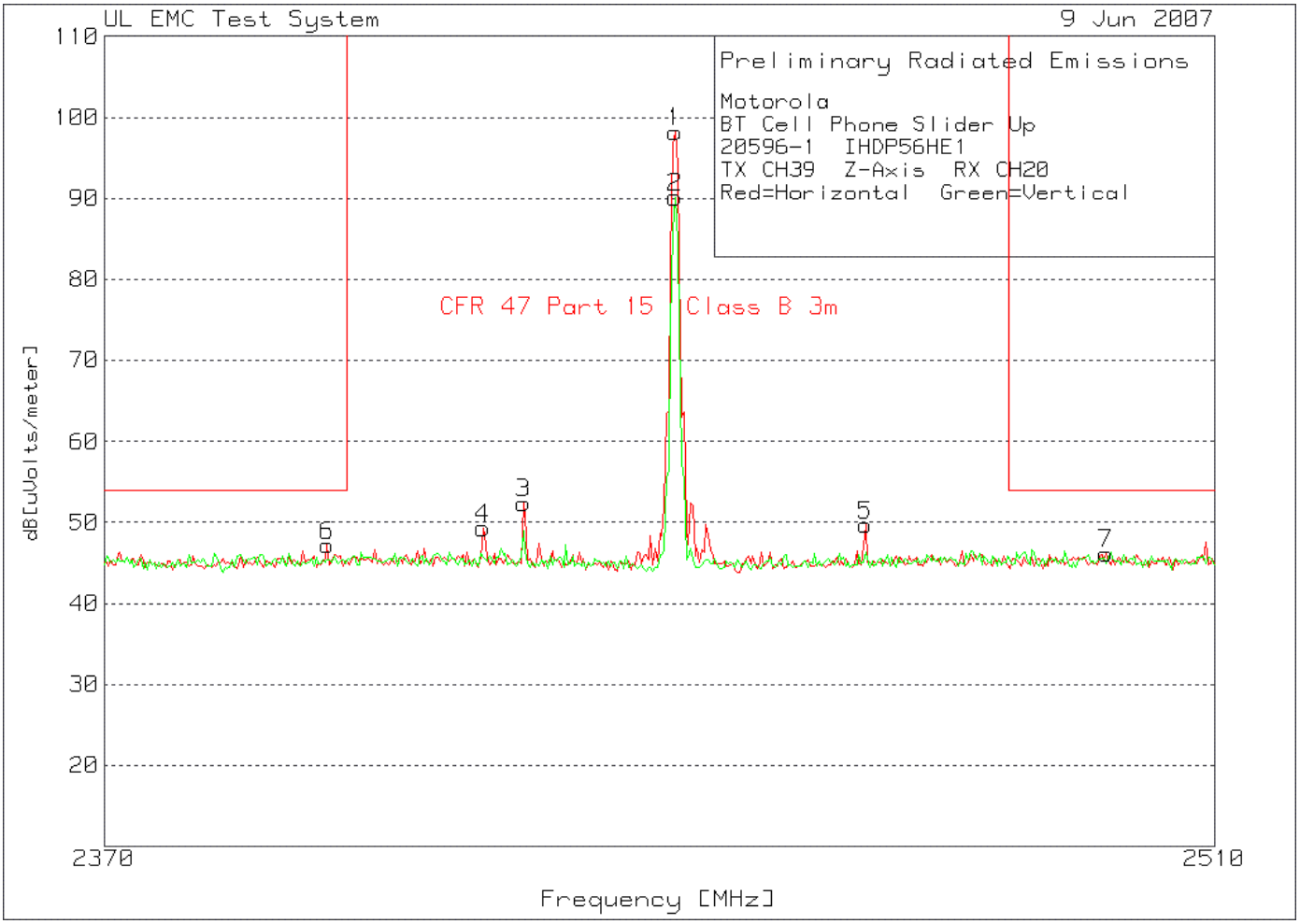

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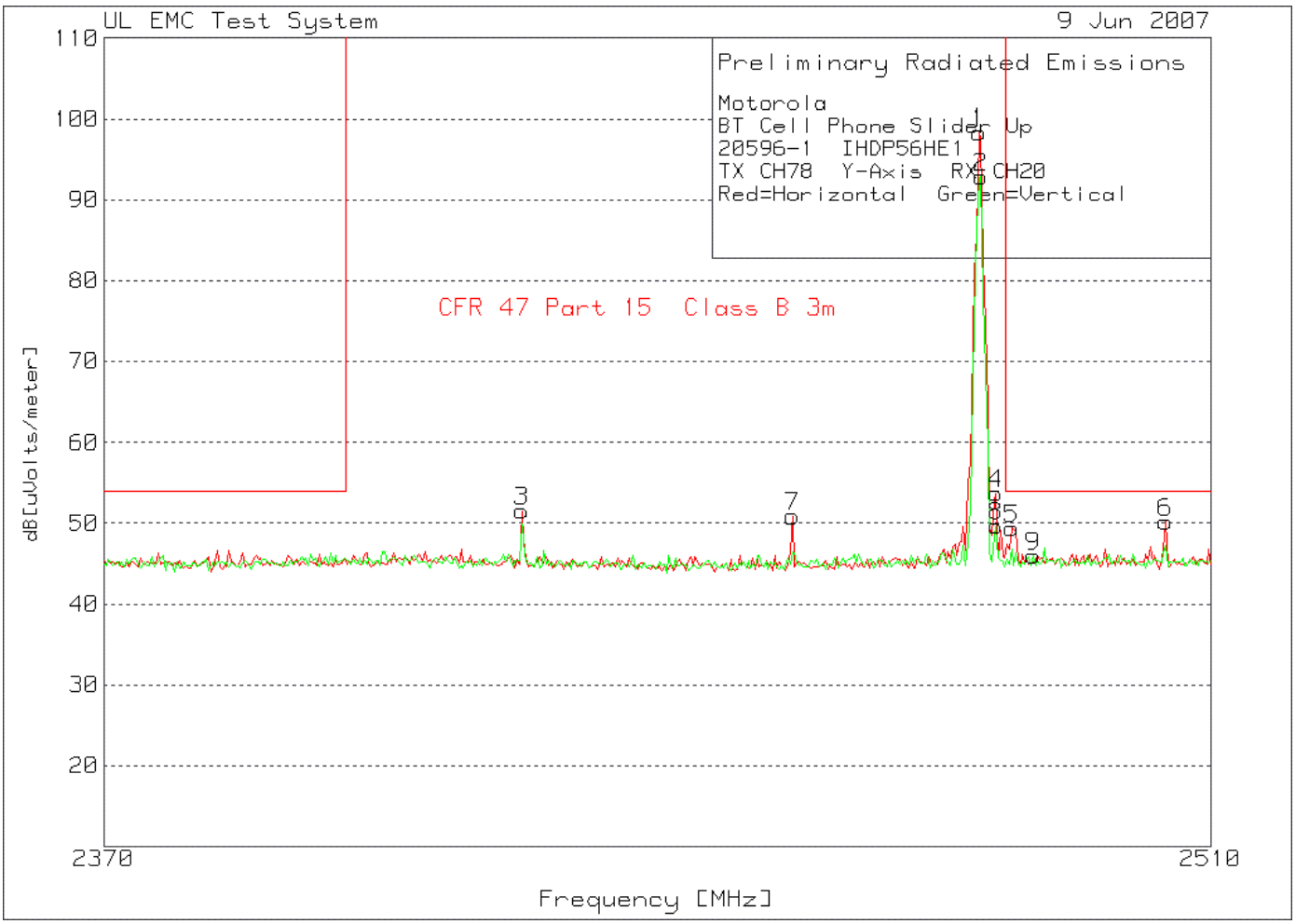
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	2-4GHz Horn



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Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	:	**Motorola Inc.**
Equipment Under Test	:	**20596-1 Cell Phone (Inband)**
Requirement	:	**CFR 47 Part 15 Class B**
Detection Mode	:	Peak (pk)
Bandwidth	:	1 MHz
Measurement Distance	:	3 meter
Antenna Type	:	2-4GHz Horn

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 6-9-2007

Manufacturer	**:**	**Motorola Inc.**
Equipment Under Test	**:**	**20596-1 Cell Phone**
Requirement	**:**	**CFR 47 Part 15 Class B**
Detection Mode	**:**	Average (VBW=10Hz)
Bandwidth	**:**	1 MHz
Measurement Distance	**:**	3 meter
Antenna Type	**:**	1-25GHz Horn

FINAL AVERAGE DATA

Preliminary peak scans were performed in low, mid and high channels as well as with EUT configured along X, Y and Z orthogonal axis.

Per clause 15.35 of CFR 47, Part 15 and DA 00-705, the measured field strength was determined by averaging the pulse train over a 0.1 second interval.

Per data provided by the manufacturer the EUT's measured dwell time is 2.9 ms and based on the fact that the same channel will not be reused within 100 ms period, the average value of measured emissions is calculated as follows:

2.9 ms / 100ms = 0.029

20log (0.029) = -30.75dB

When the calculated relaxation is applied to the measured field strength the levels were well below the limit.

See Appendix C for Dwell Time measurement provided by the manufacturer.

APPENDIX C

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:

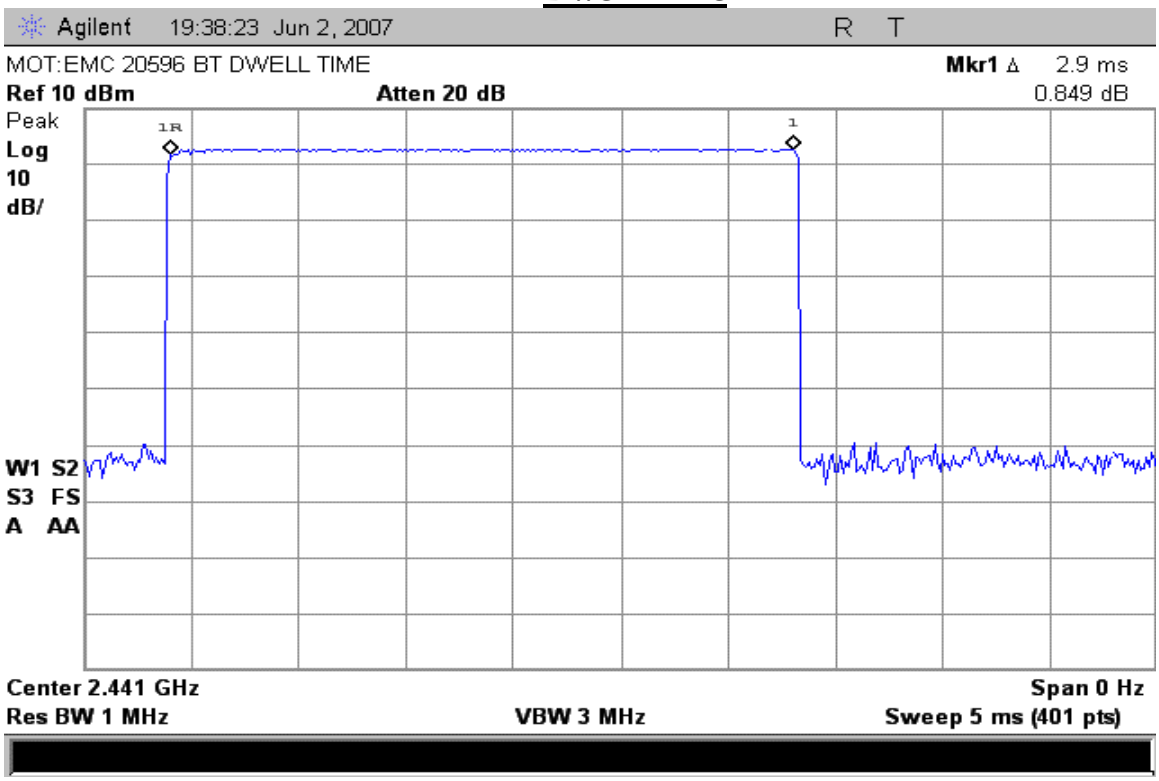
1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW = RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

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

Measurement Results

Attached

Dwell Time



Dwell Time

APPENDIX D

BT Operating Instructions provided by Motorola in an e-mail communication dated June 4, 2007.
For confidentiality reasons the information is not provided and it is available upon authorized request.