



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/>

August 22, 2006

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

UL Reference: File MC15003, Project 06CA43291

Subject: EMC Test and Measurement Report for
Cell Phone, FCC ID - IHDT56GZ1

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 06CA43291.

Best regards,

Reviewed by:

A handwritten signature in black ink, appearing to read 'Lou Madjarov'.

A handwritten signature in black ink, appearing to read 'Jack Steiner'.

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

Jack Steiner
Section Manager
International EMC Services

REPORT DIRECTORY

SECTION TITLE

GENERAL

- 1.0 General Product Description
- 1.1 Model Differences
- 1.2 Environmental Conditions in Test Lab
- 1.3 Calibration Details of Equipment Used for Measurement
- 1.4 EUT (Equipment Under Test) Configuration
- 1.5 EUT Operating Mode
- 1.6 Device Modifications

EMISSIONS

- 2.0 Emissions Test Regulations
 Radiated Electric Field Emissions

IMMUNITY

- 3.0 Immunity Test Regulations

CONCLUSION

- 4.0 General Remarks
- 4.1 Summary

APPENDICIES

- A Test Setups (Photos, Diagrams and Drawings)
- B Test Data
- C Operating instructions provided by the manufacturer

1.0 GENERAL PRODUCT DESCRIPTION

The equipment under test (EUT) is a BlueTooth cell phone IHDT56GZ1.

1.0.1 Equipment Mobility:

Hand-held

1.0.2 Test Voltage and Frequency:

| <u>Voltage (V)</u> | <u>Frequency (Hz)</u> |
|--------------------|-----------------------|
| 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 | 1/06/06 | 1/06/07 |
| Hewlett Packard | S/A Display | 8566B | 2542A12974 | 1/06/06 | 1/06/07 |
| Hewlett Packard | S/A | 8566B | 2637A03376 | 1/06/06 | 1/06/07 |
| Rohde & Schwartz | S/A | FSEK20 | DE2525315 | 3/15/06 | 3/15/07 |
| Electro-Metrics | Bi-Con Antenna 30-300MHz | EM912A | 114 | 3/01/06 | 3/01/07 |
| Chase | Log-Periodic Antenna | UPA6109 | 1060 | 3/17/06 | 3/17/07 |
| EMCO | Horn Antenna 1-18GHz | 3115 | 6546 | 10/18/05 | 10/18/06 |
| 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 |
| UL | 40 GHz BOMS Signal Path | ULBOMS | - | 02/2005 | 02/2007 |

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 | Model | Serial # | FCC ID |
|--------|---------------|-------|----------|-----------|
| EUT | Motorola Corp | - | - | IHDT56GZ1 |

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

Per the manufacturer's specifications 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)).
- Per manufacturer's request 30 to 1000MHz, 1 to 26GHz 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 1000MHzTest Location

10 Meter Semi- Anechoic Chamber

UL ProcedureNorthbrook Work Instruction for Measurement of Radiated Emissions (EMC)
08-CA-W0030Test InstrumentsSpectrum 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

| | | |
|--|----------|---------|
| Electro-Metrics, Biconical Antenna Model EM6912A | S/N 114 | EMC4070 |
| Chase EMC Ltd., Log Periodic Antenna Model UPA6109 | S/N 1060 | EMC4258 |

Frequency Range of Measurement

30MHz-1000MHz

Measurement Distance

10 meters, 30MHz-1000MHz

Test ResultsThe requirements are:
METRemarks

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 | 6546 |
| 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.

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 : August 3, 2006

Test Dates

Start : August 3, 2006

End : August 5, 2006

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



Radiated Emissions
X-Axis

Not actual phone shown but representative of EUT test configuration.

Manufacturer will provide required photos separately.



Radiated Emissions
Y-Axis



Radiated Emissions
Z-Axis

APPENDIX B

TEST DATA

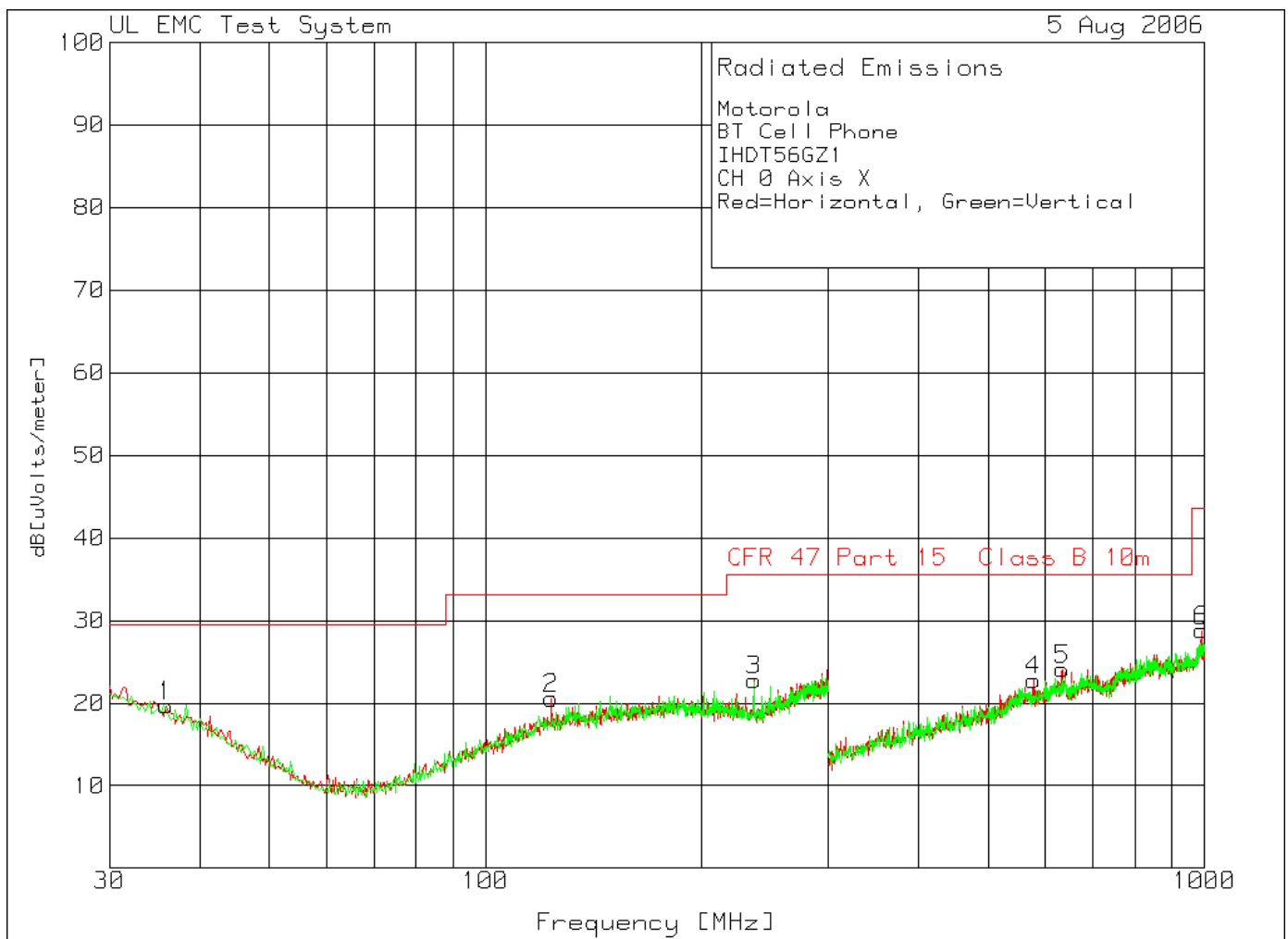
EMISSIONS

Radiated Electric Field Emissions

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

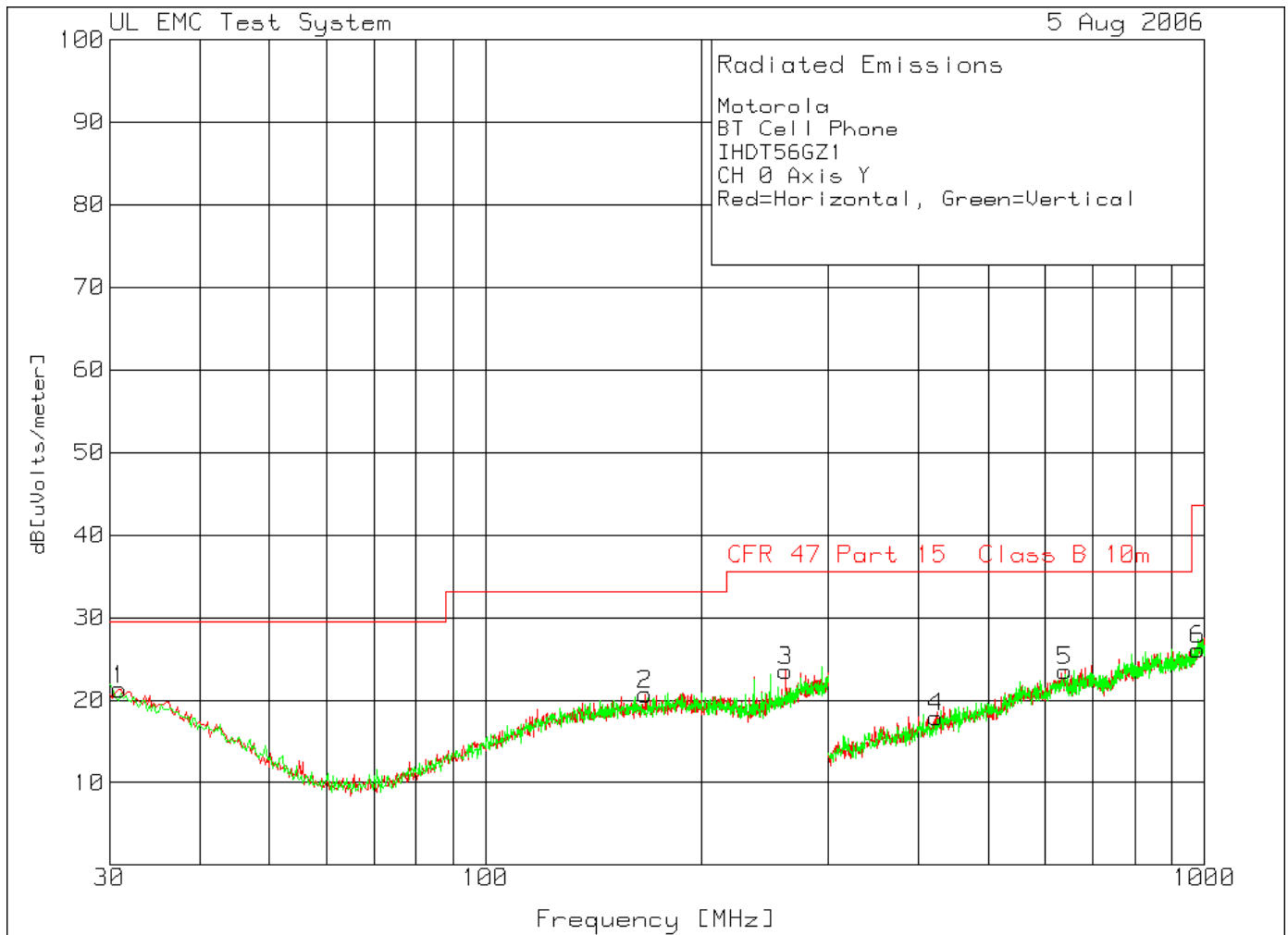
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

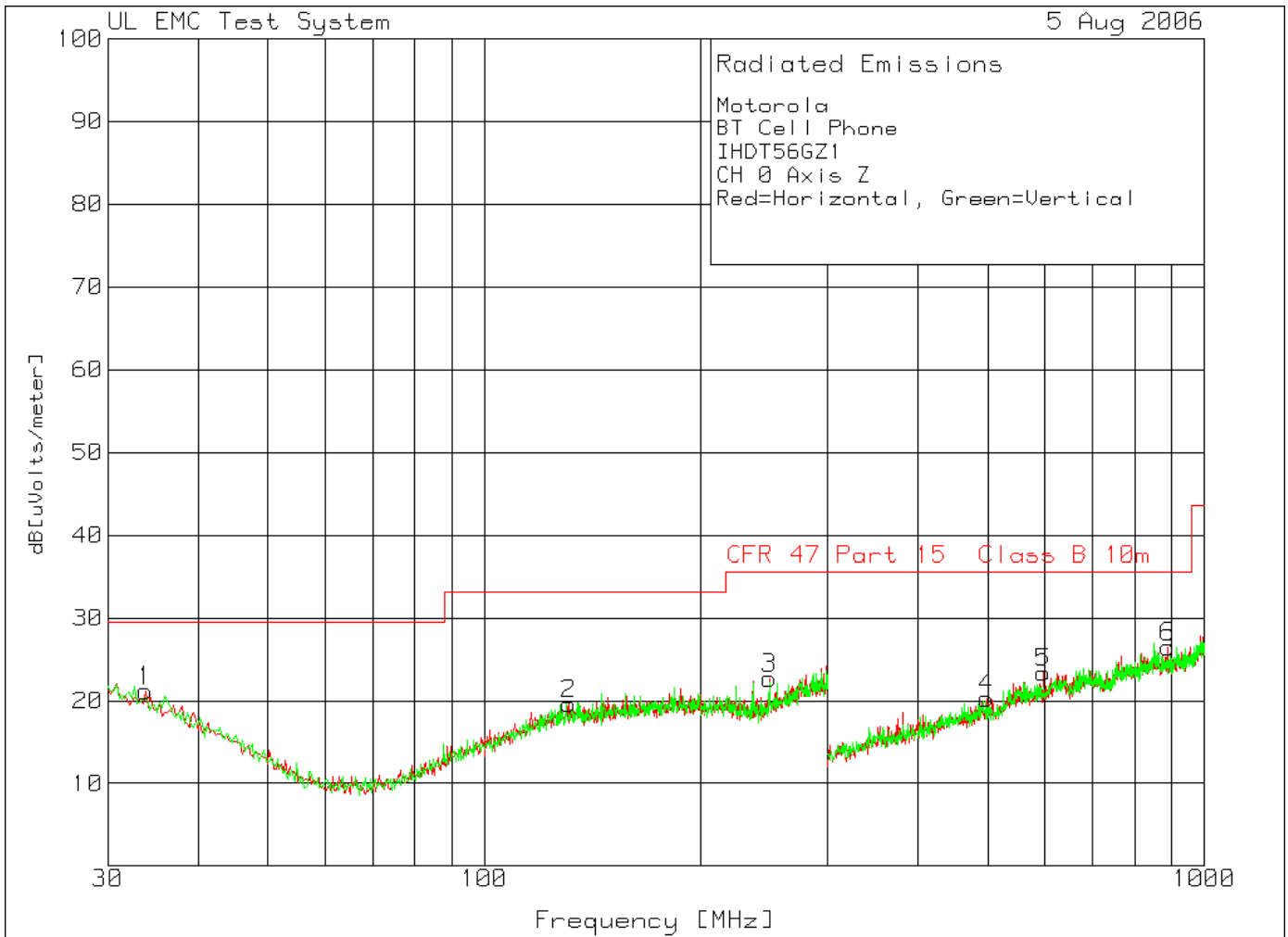
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

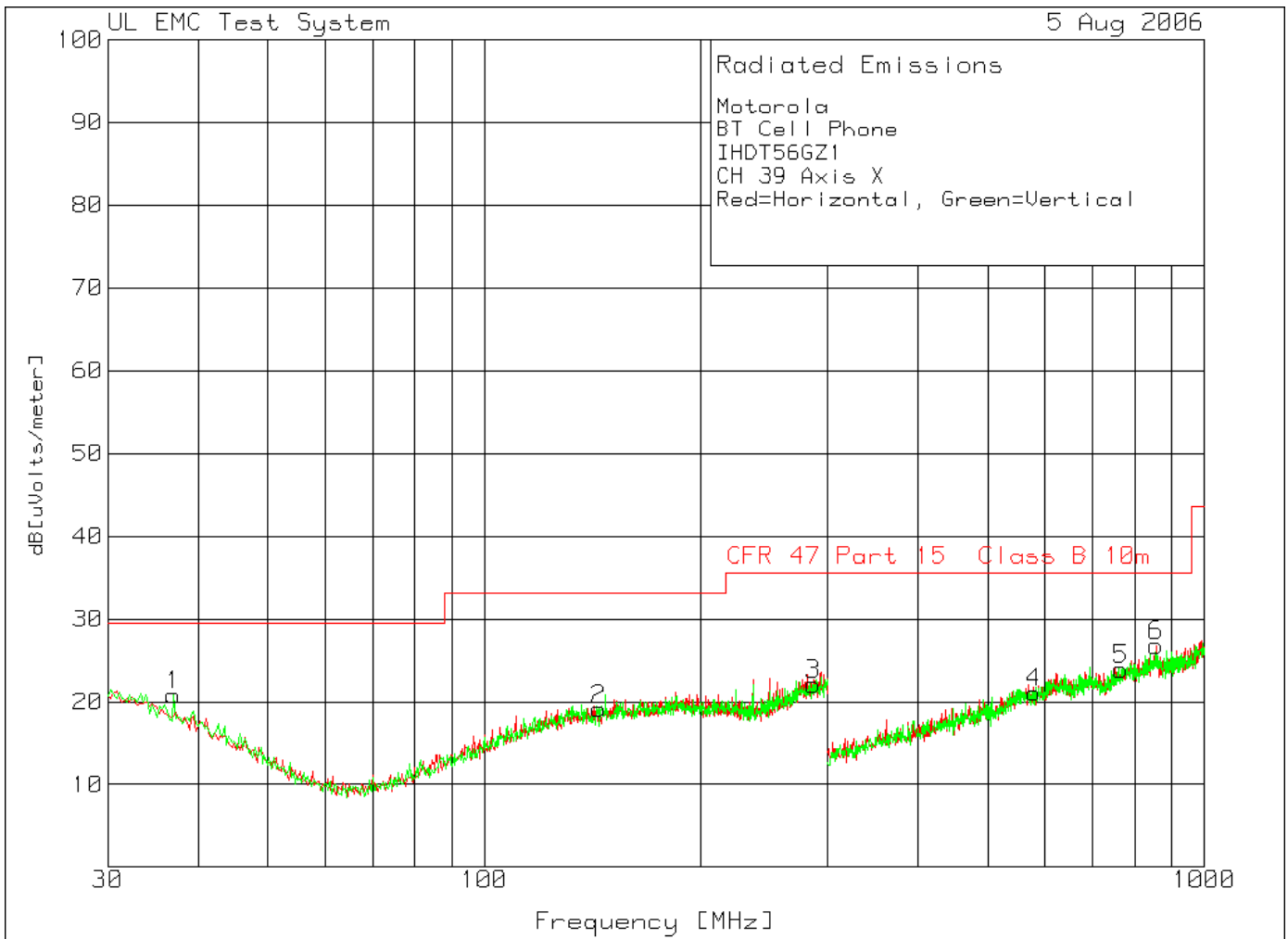
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

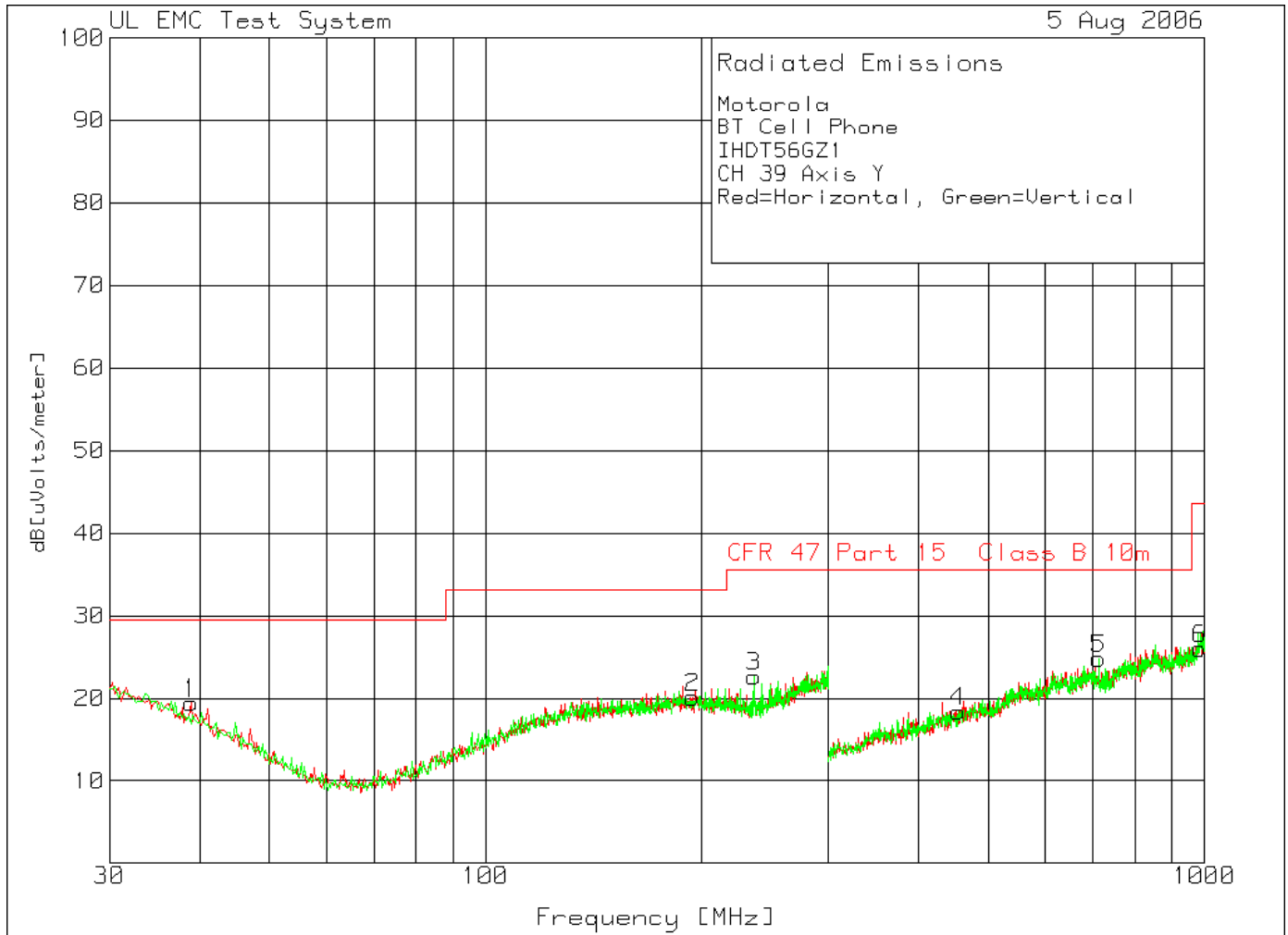
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

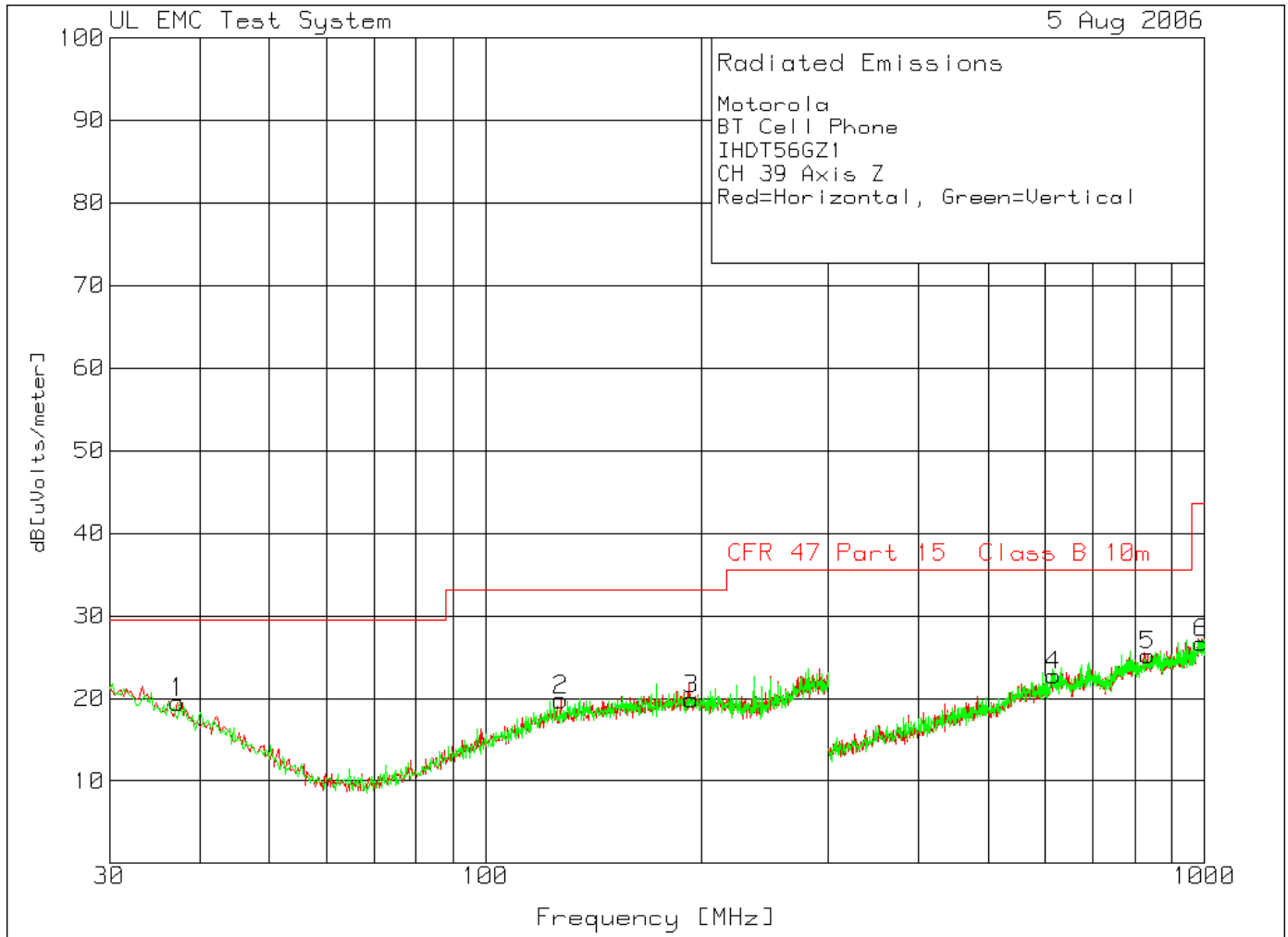
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

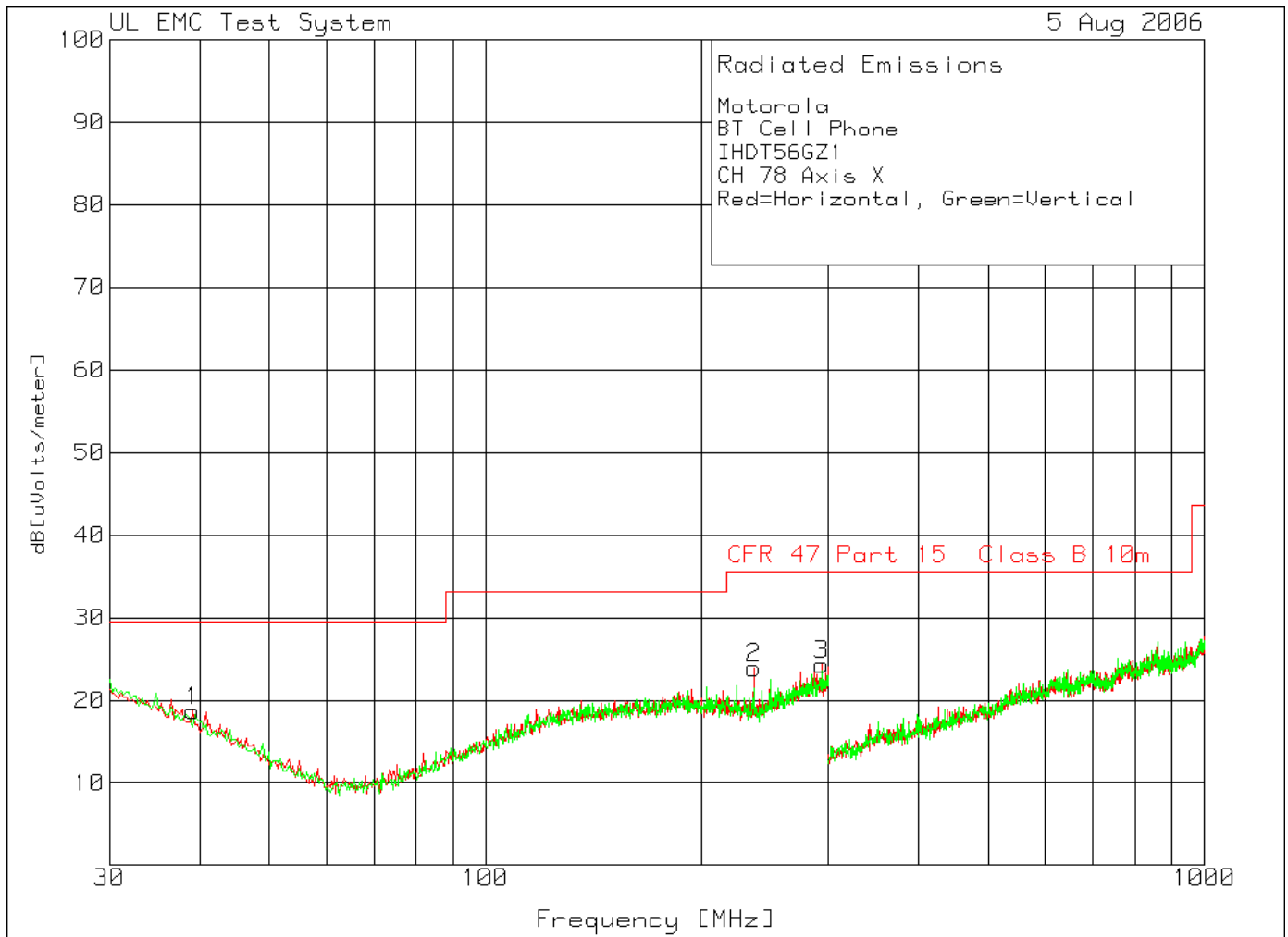
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

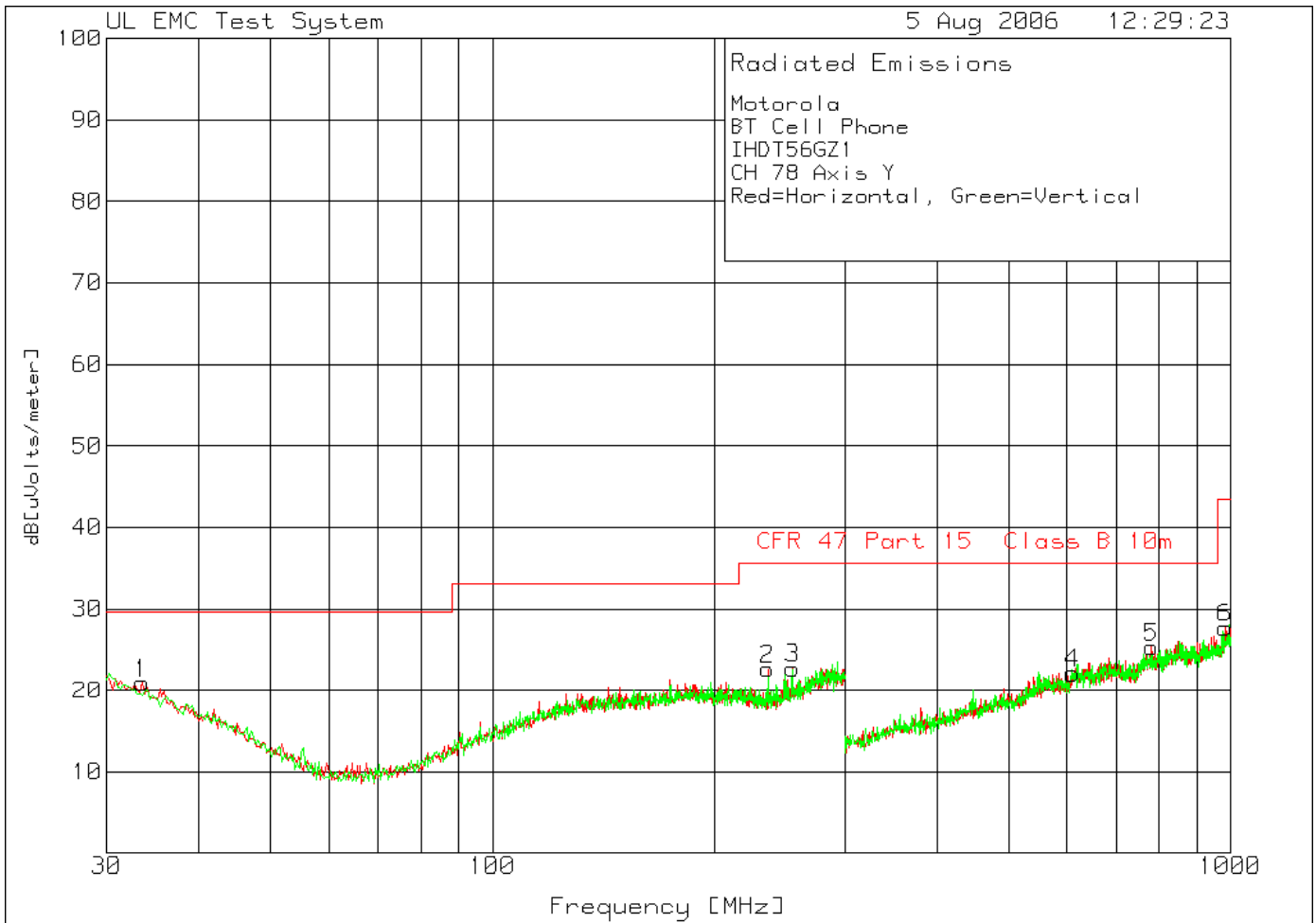
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

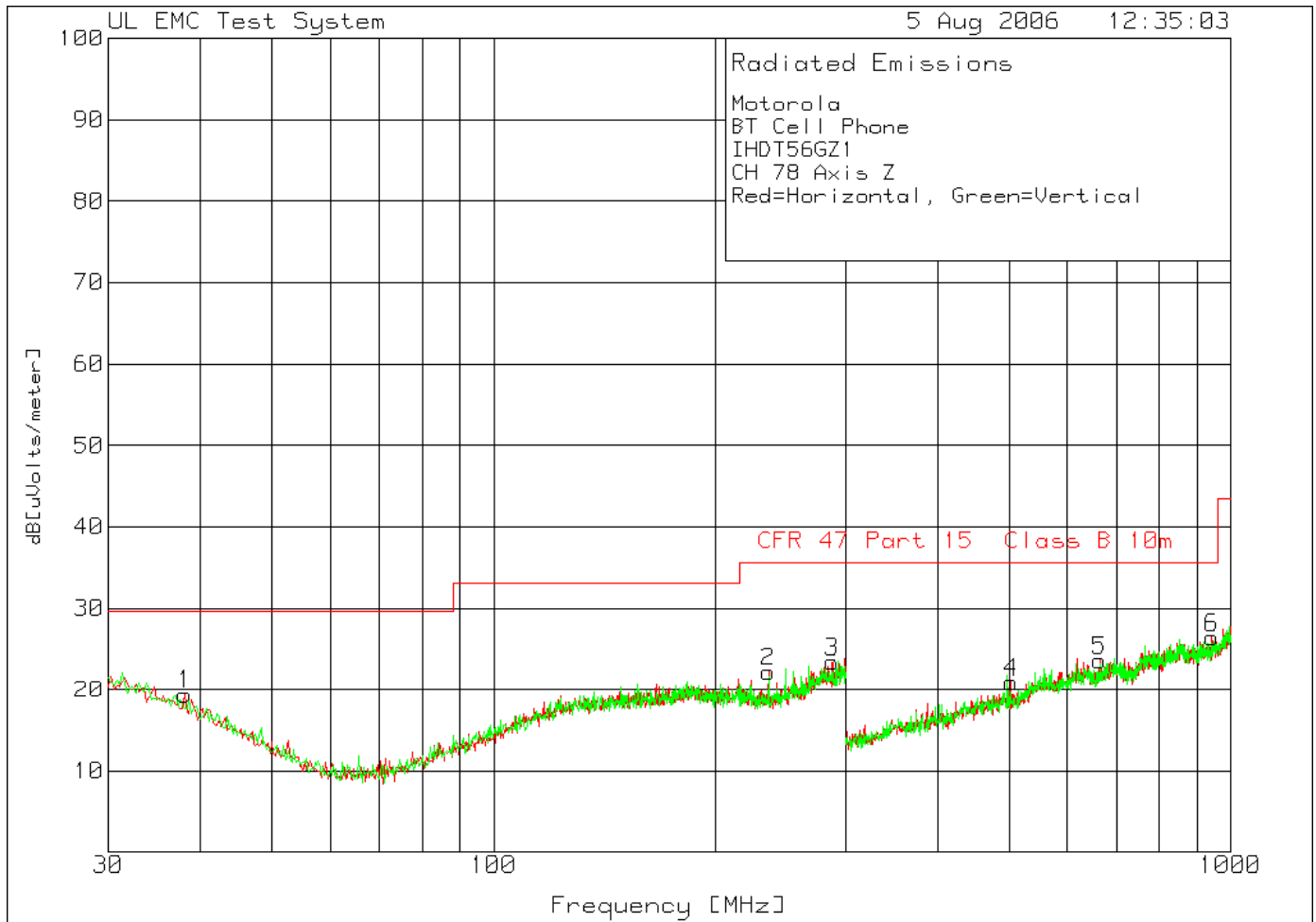
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

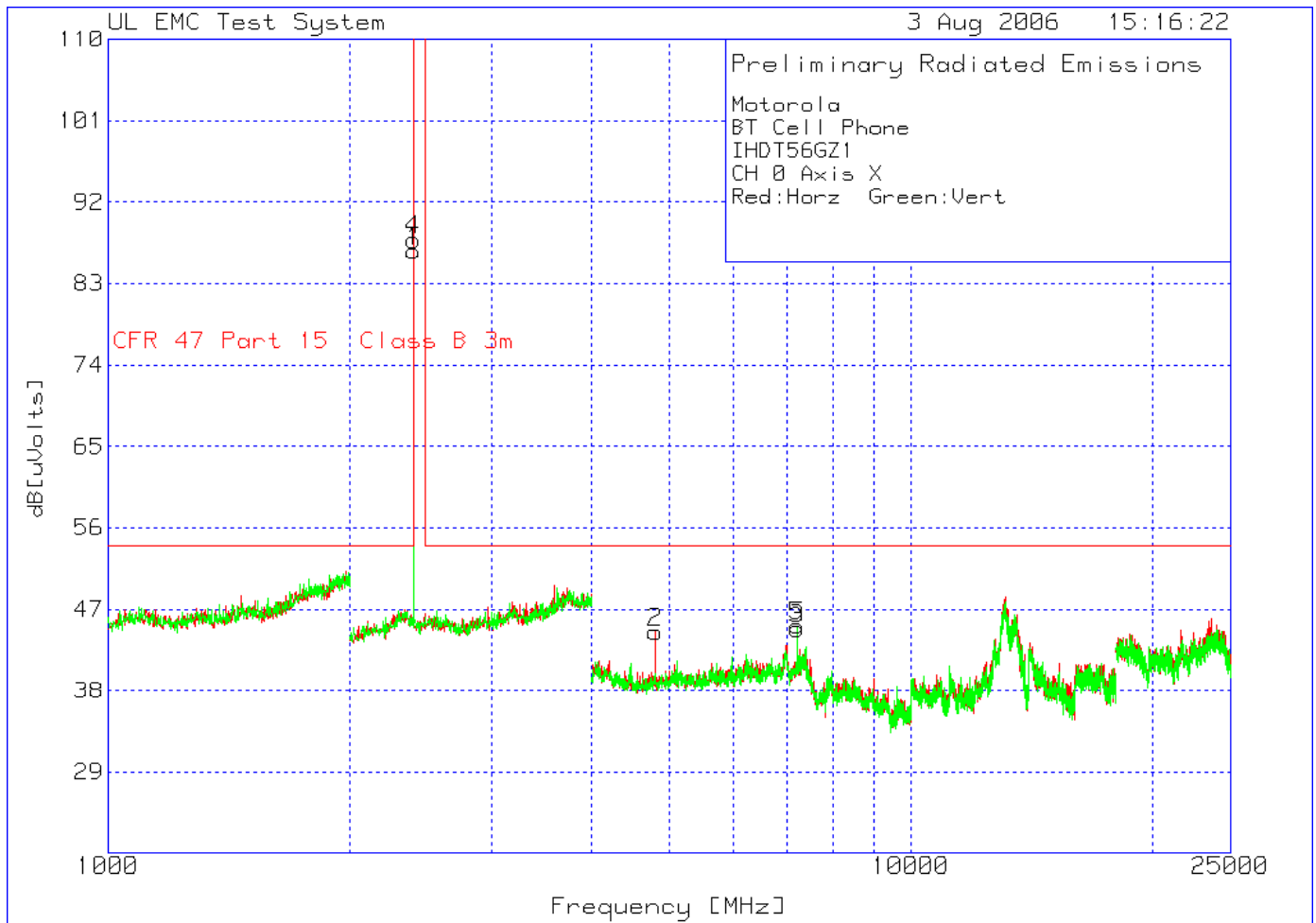
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 3, 2006

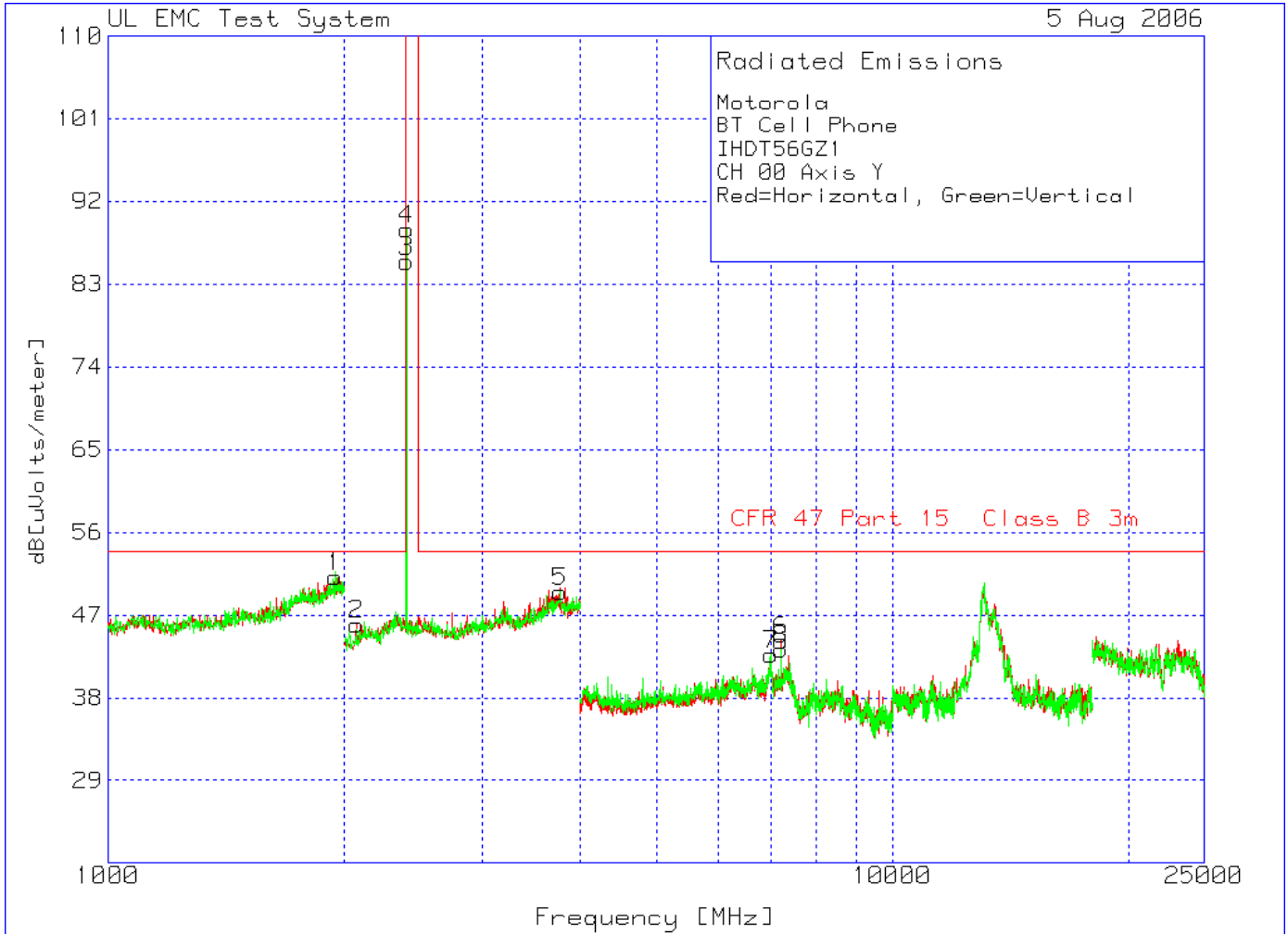
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

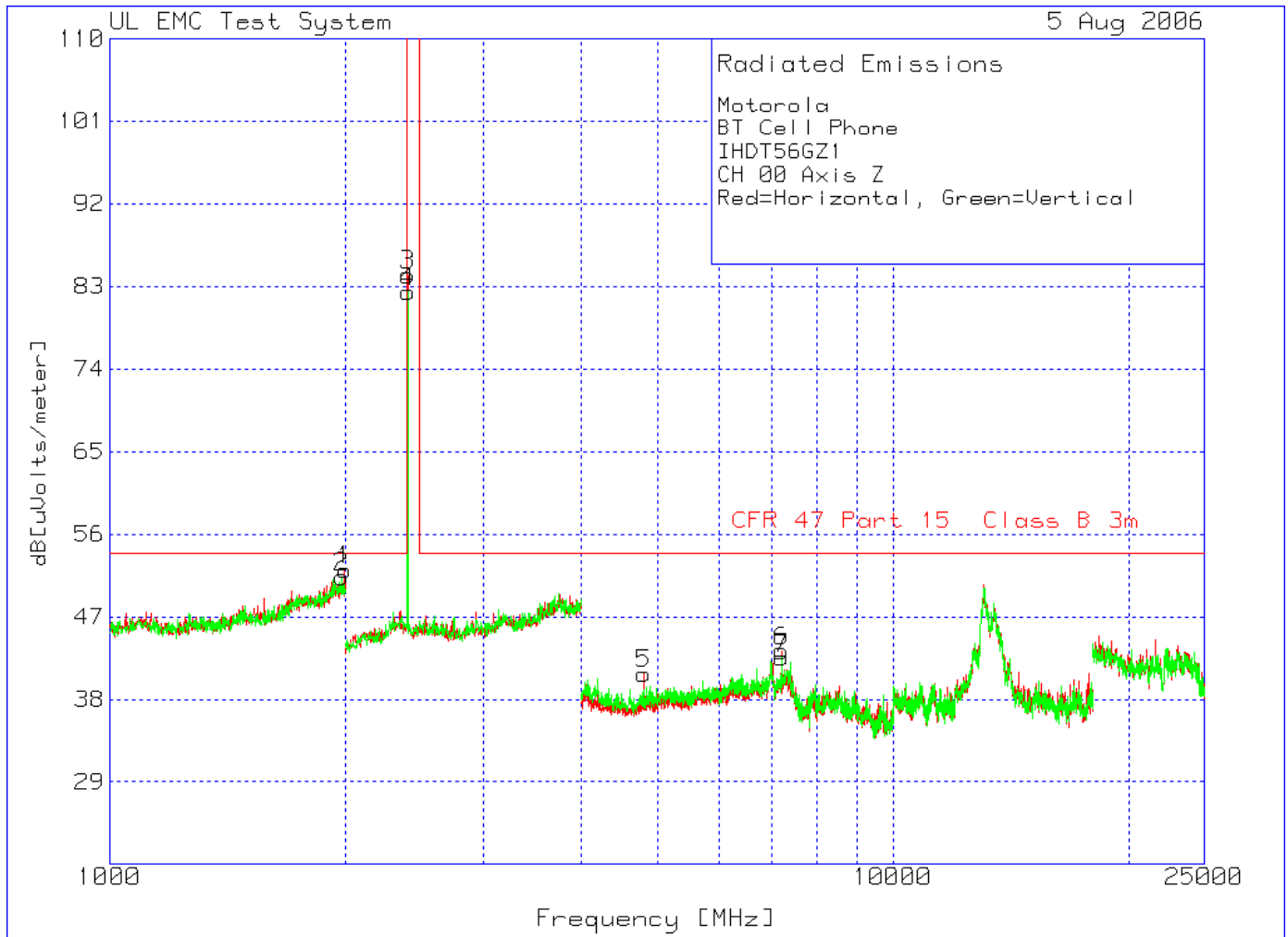
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

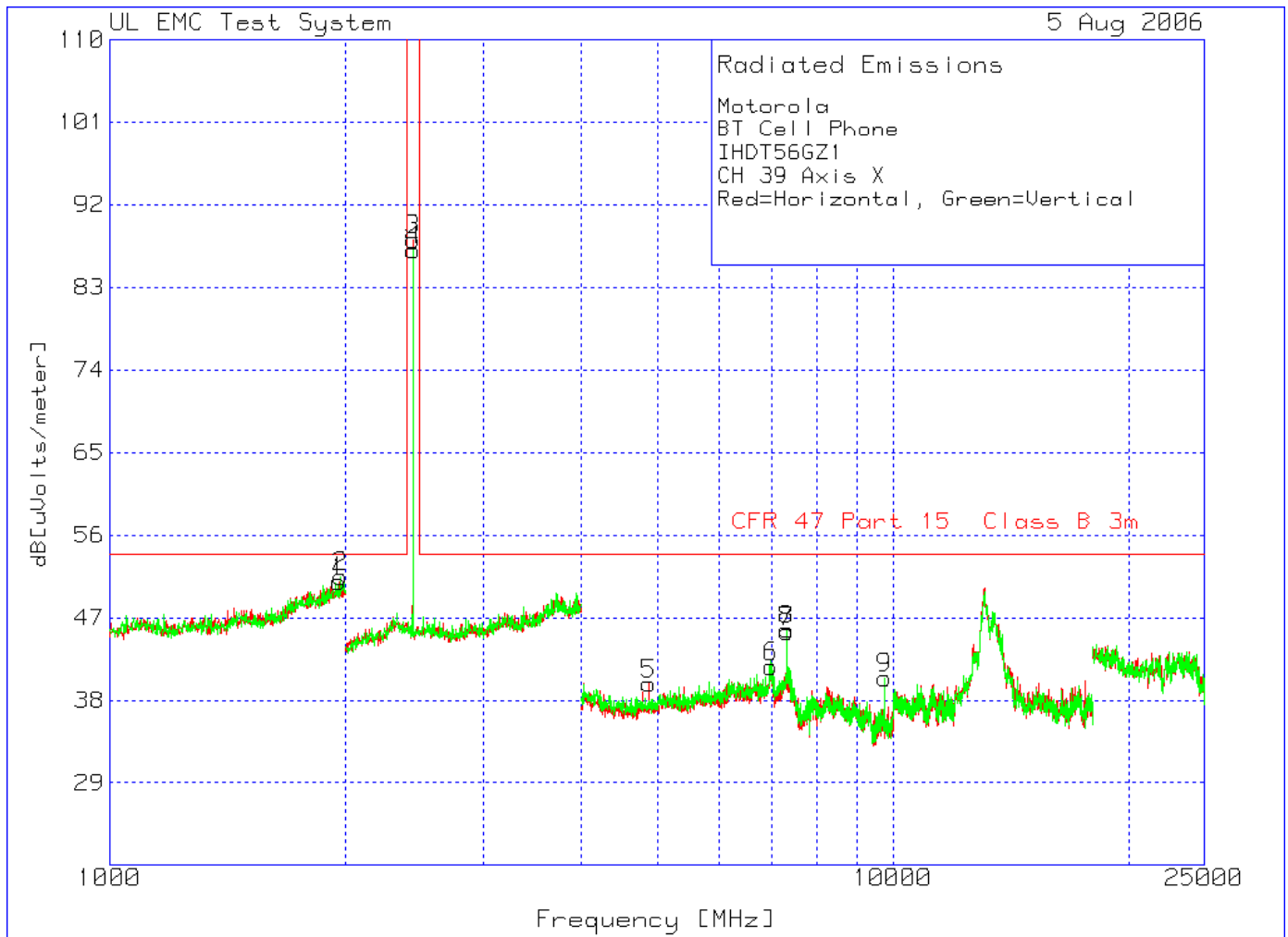
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

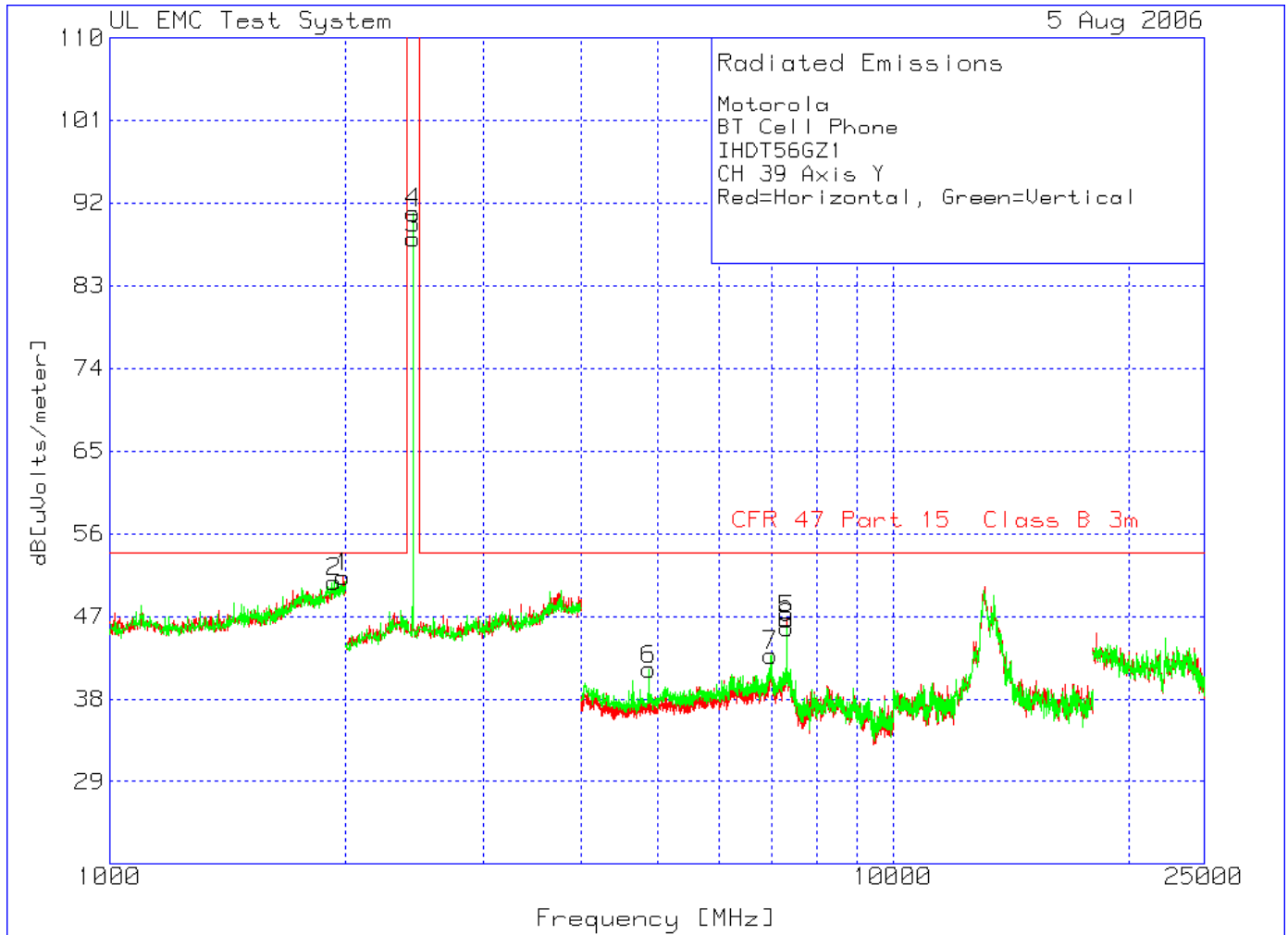
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

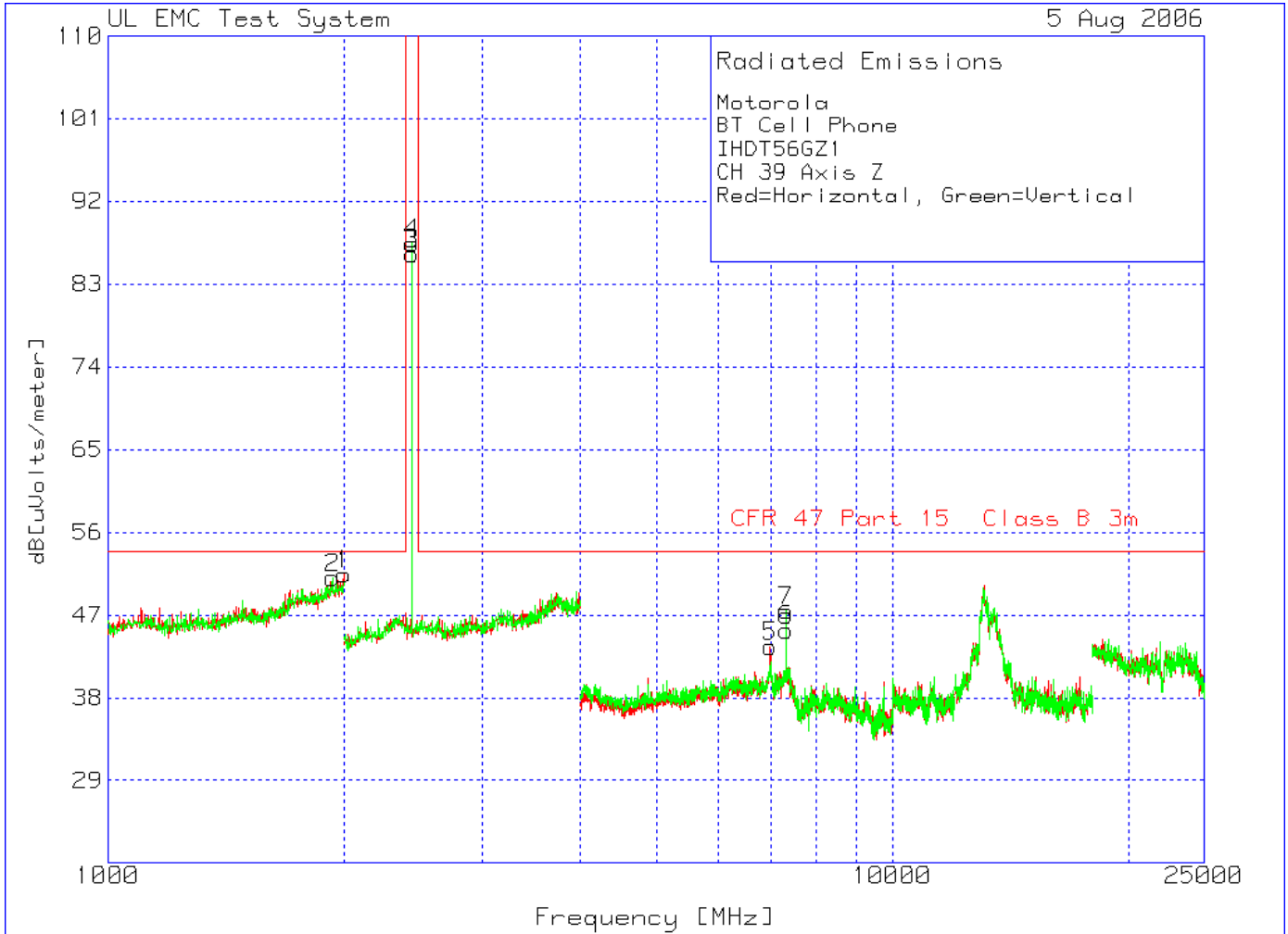
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

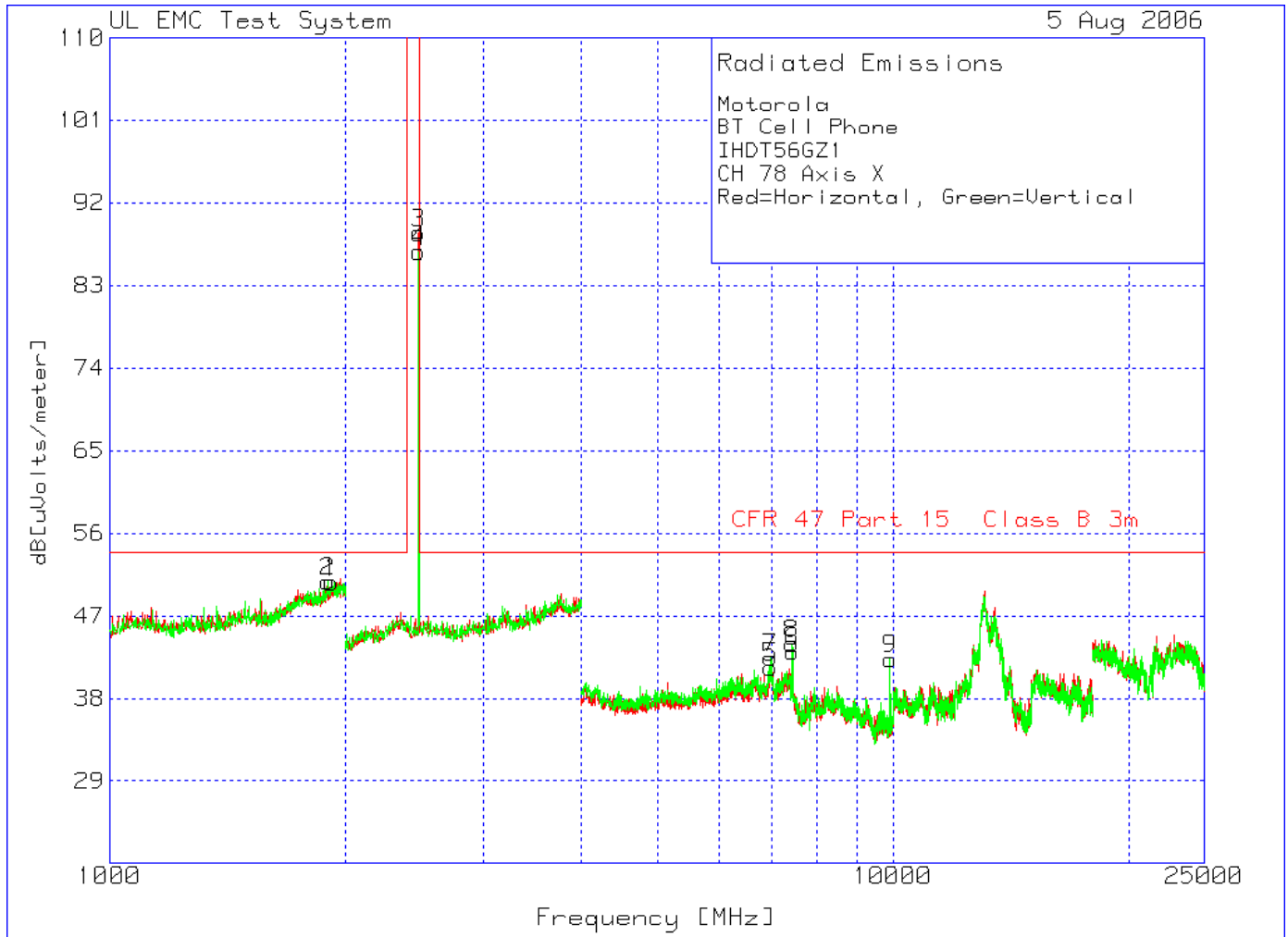
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

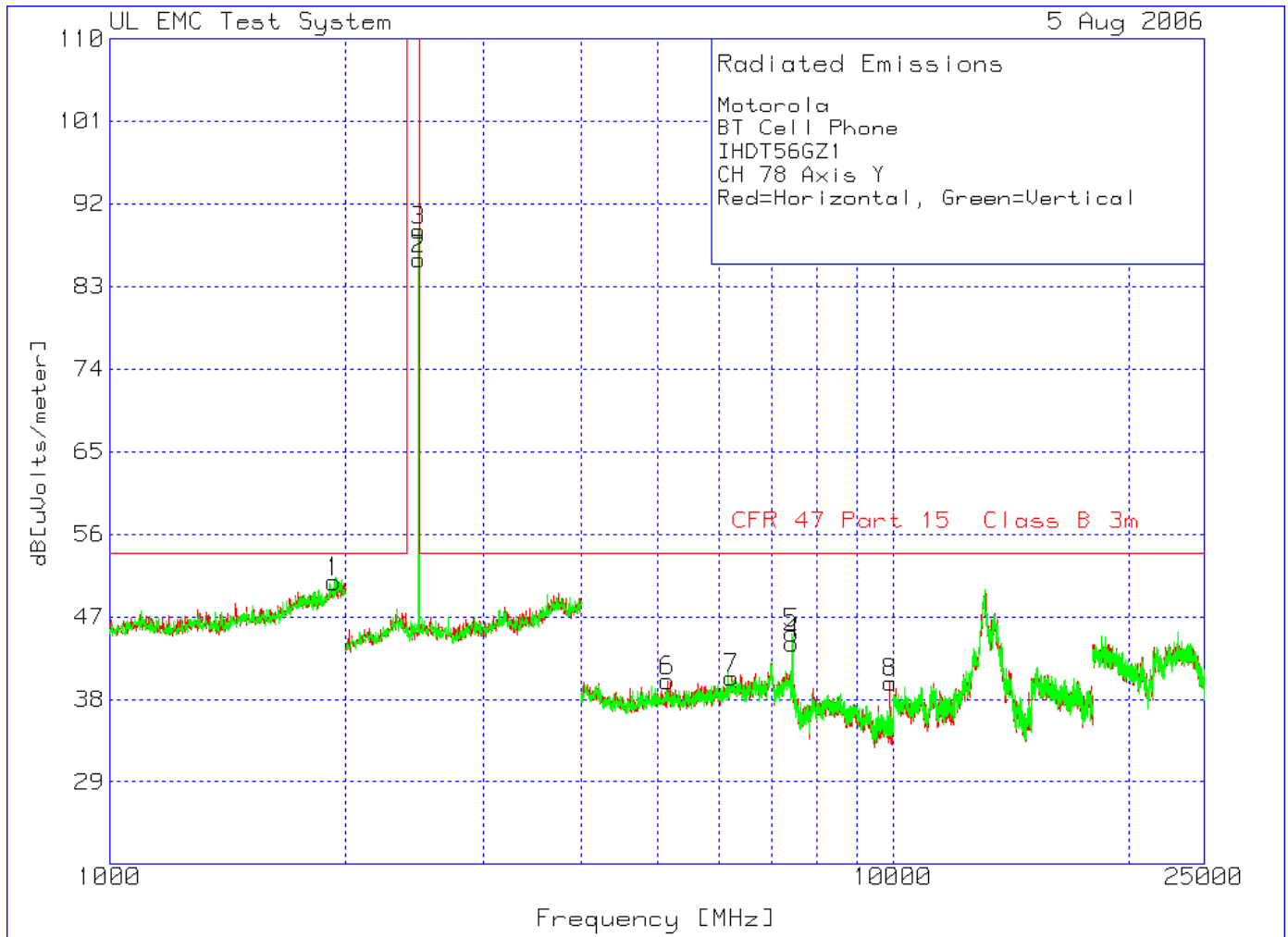
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

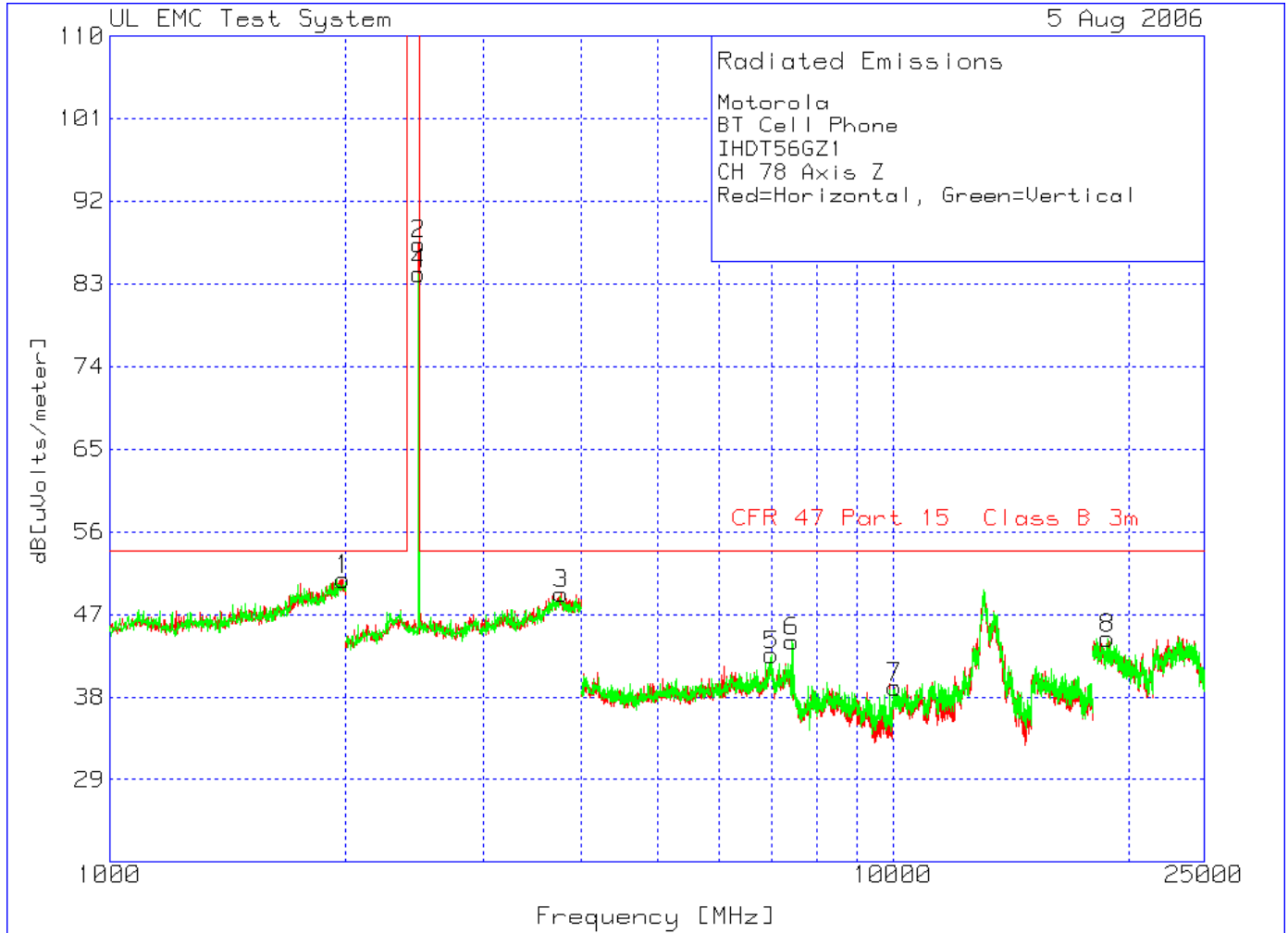
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn Antenna Array



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 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: August 5, 2006

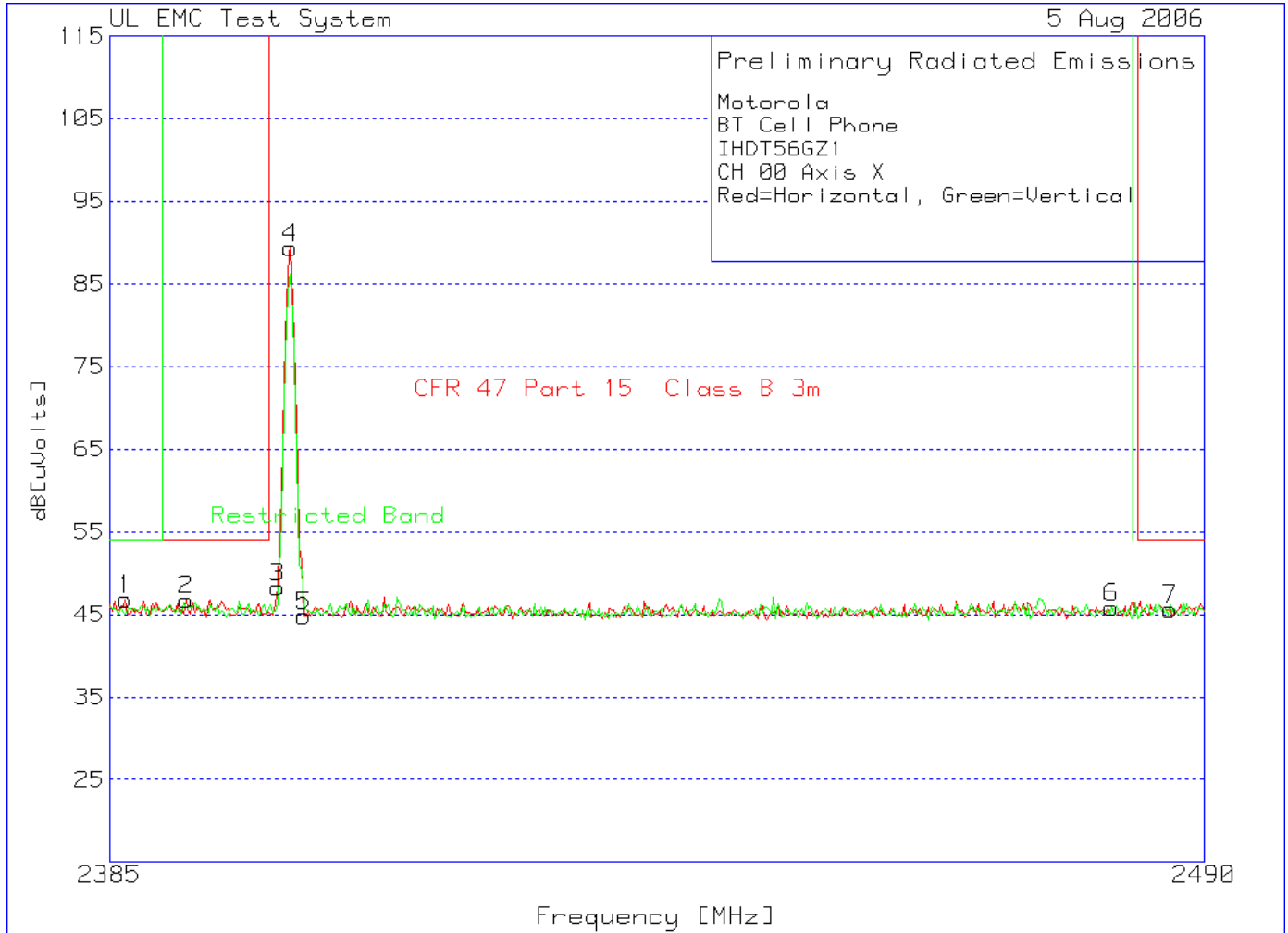
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone
Requirement : CFR 47 Part 15 Class B
Detection Mode : Average (VBW=10Hz)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 1-25GHz Horn

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) average measurements were not considered necessary as preliminary peak measurements were greater than 6dB under the FCC limit.

UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

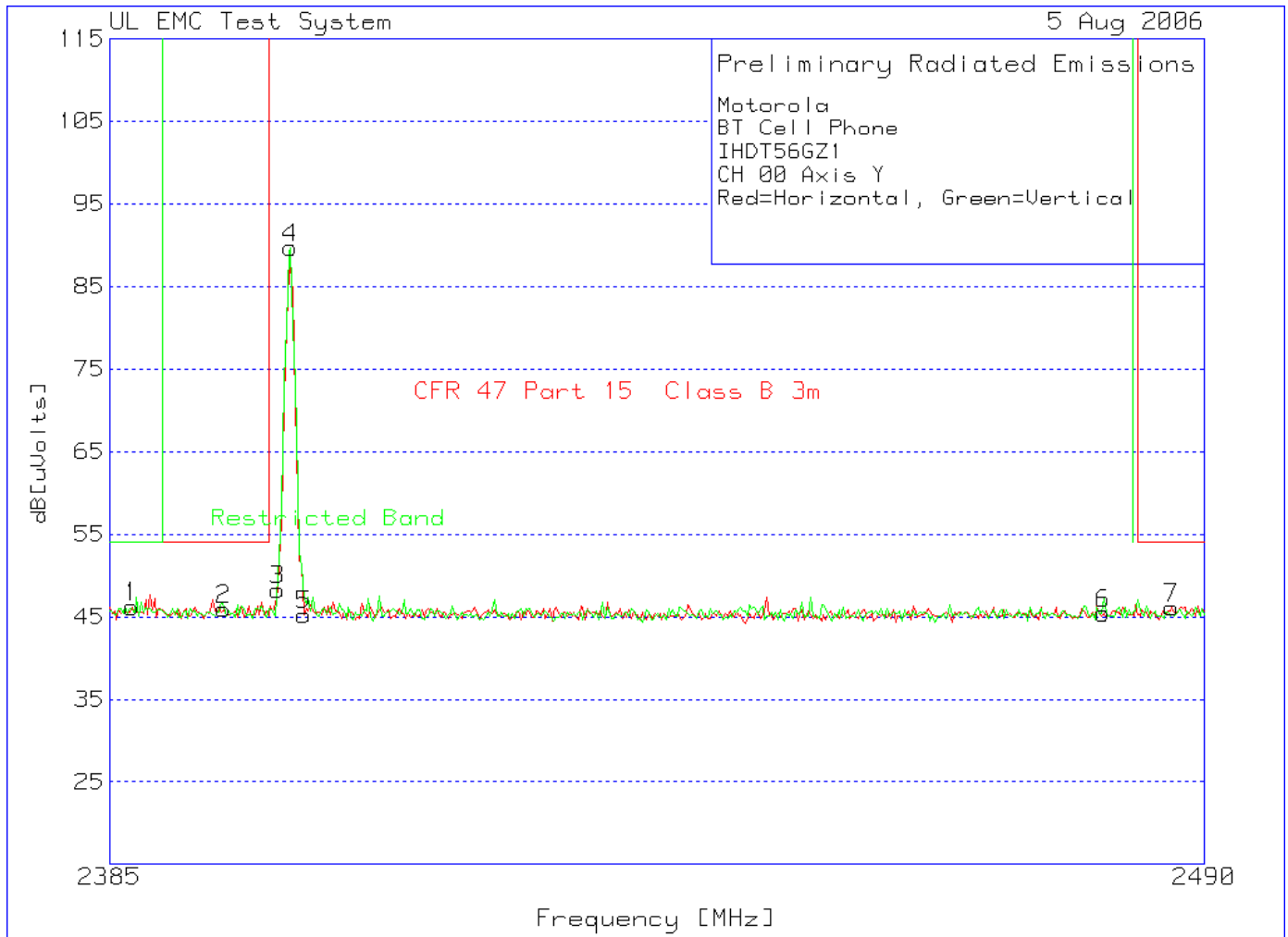
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

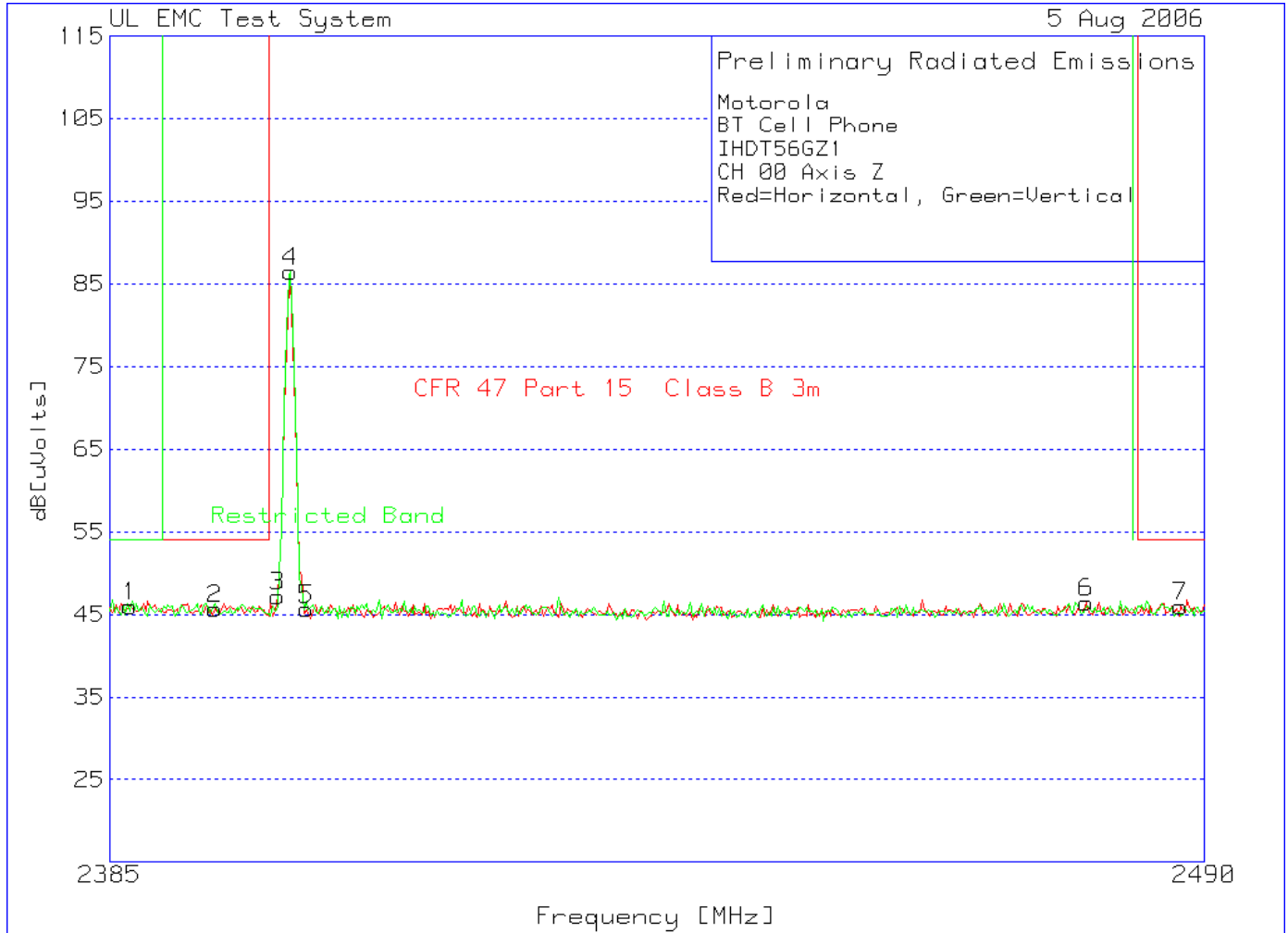
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

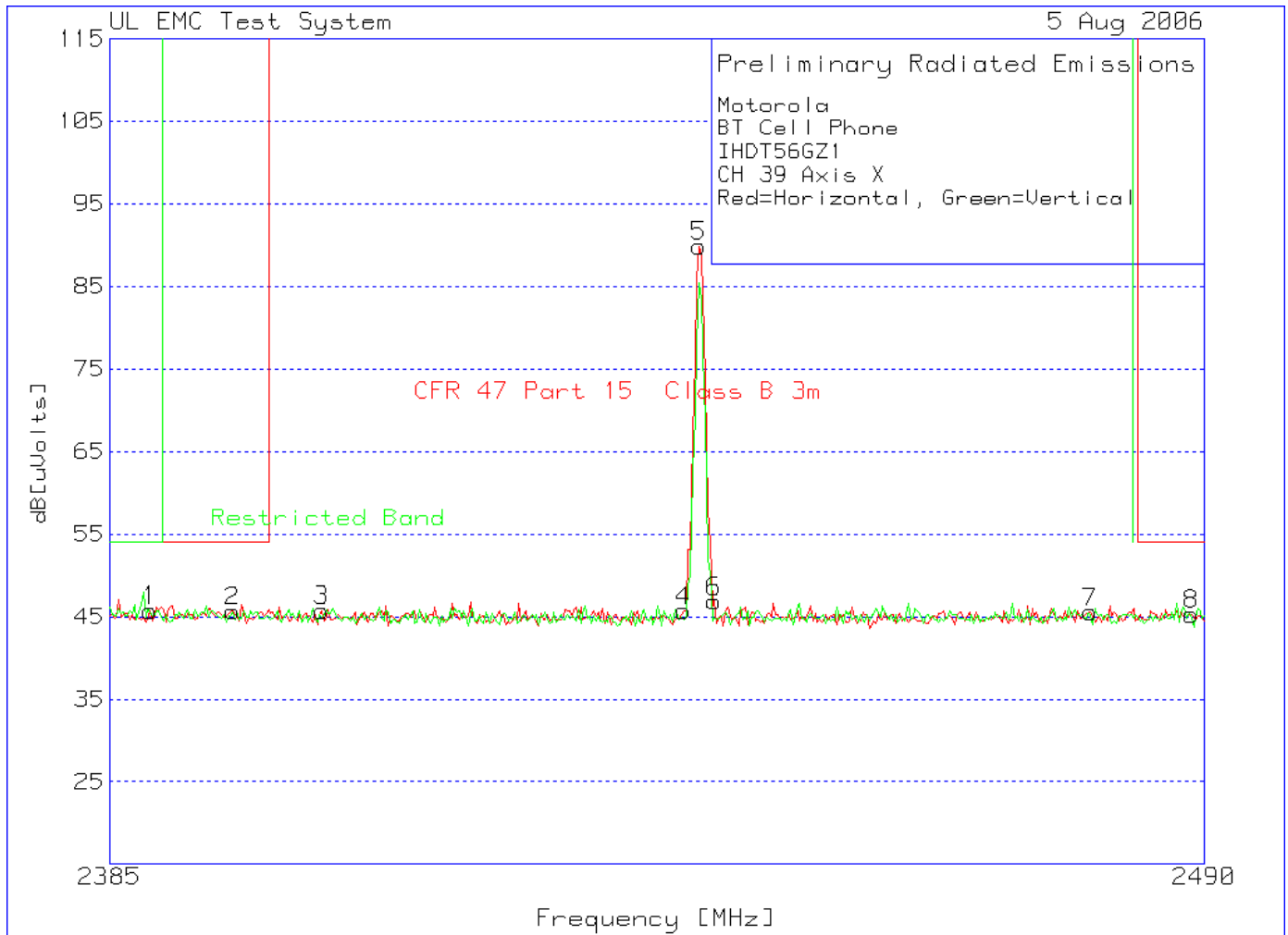
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

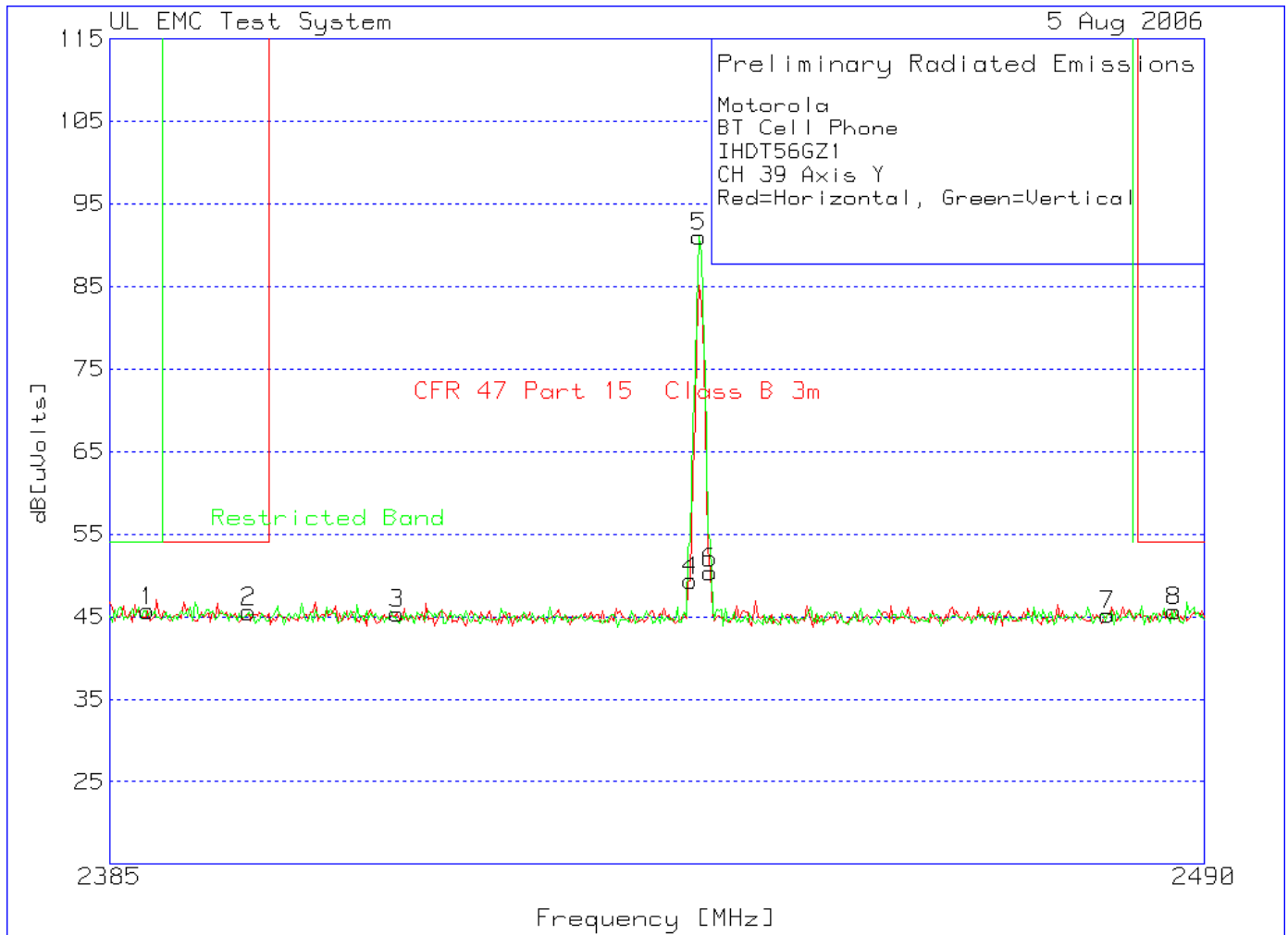
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

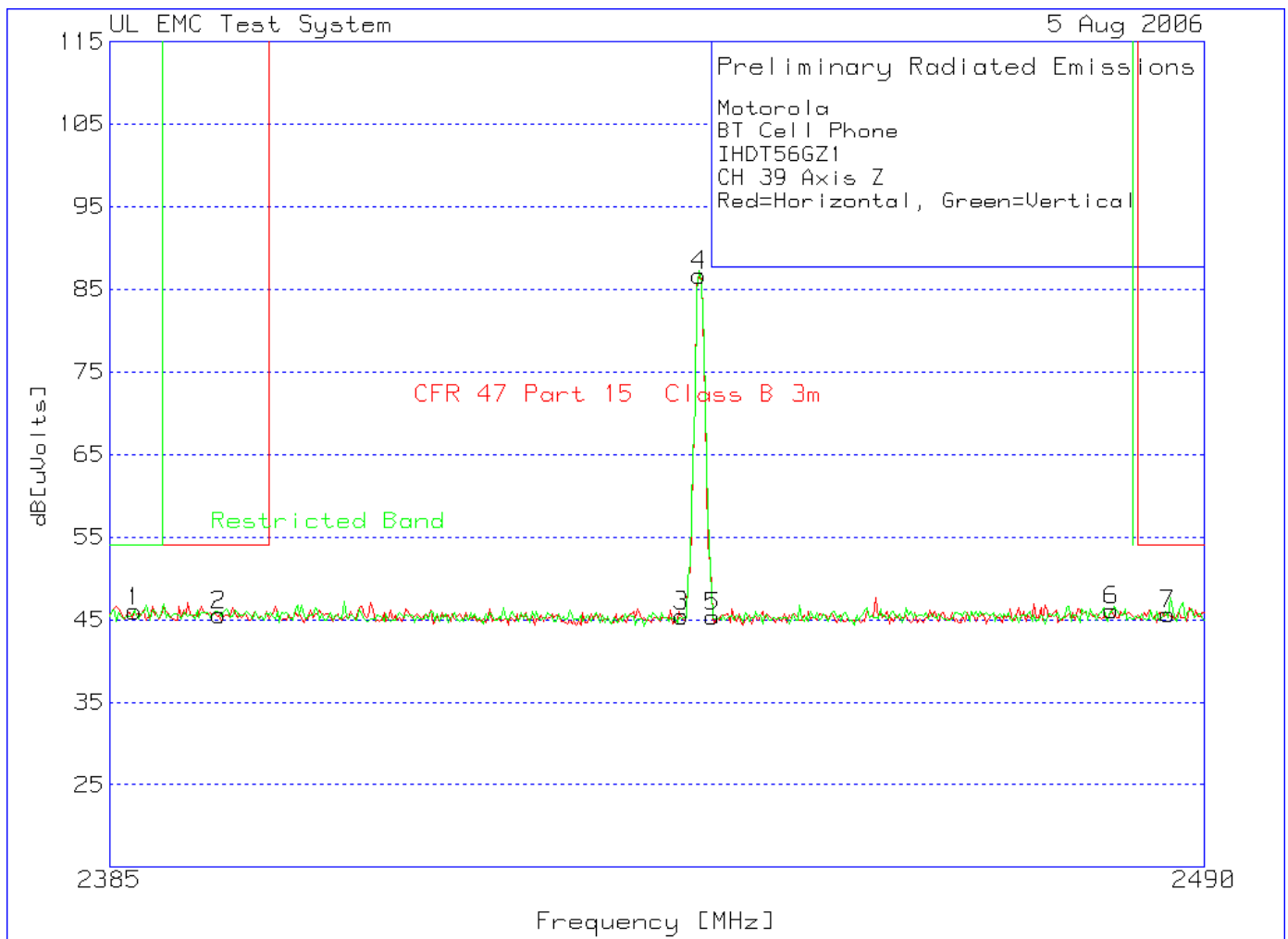
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

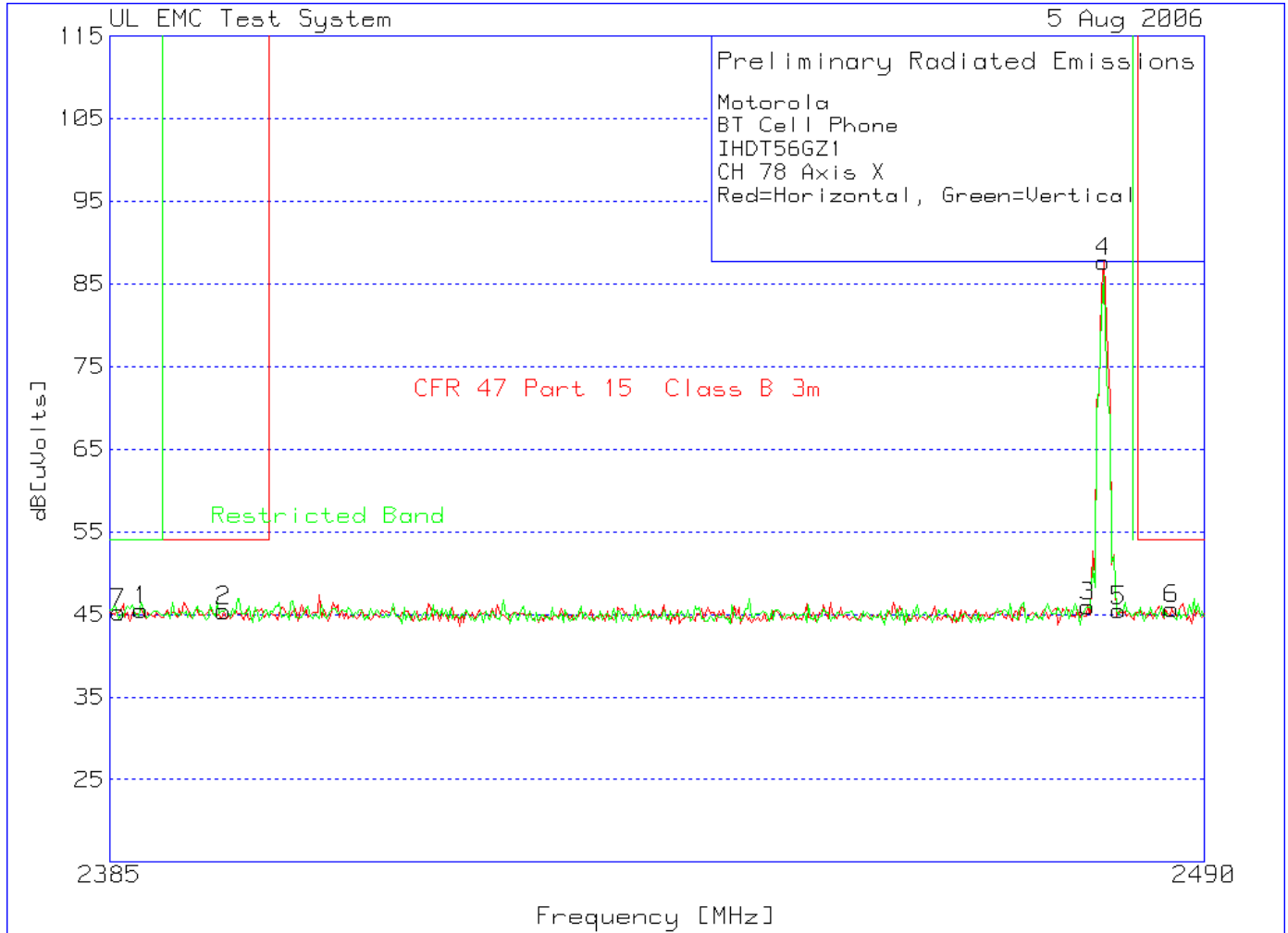
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
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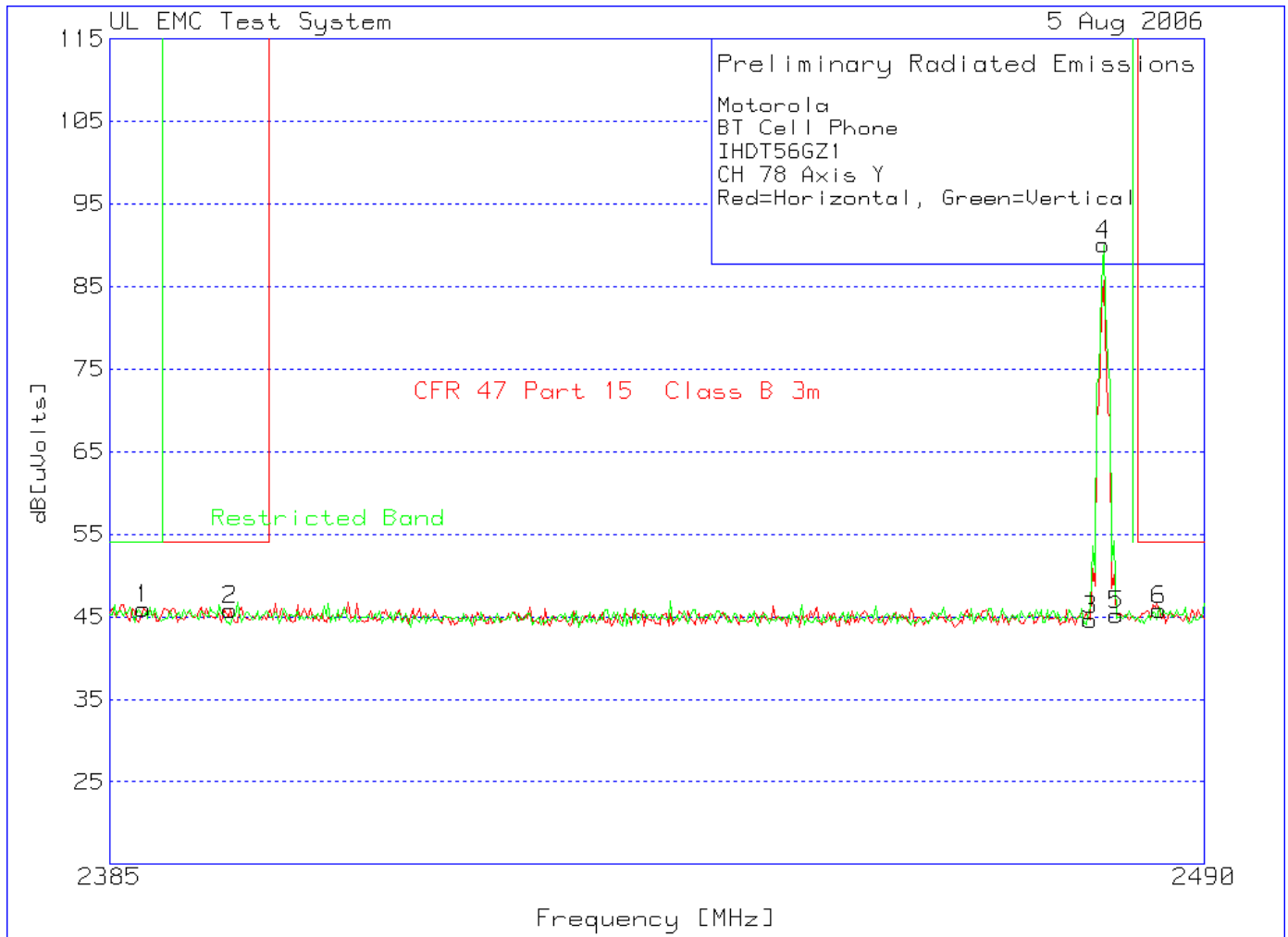
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

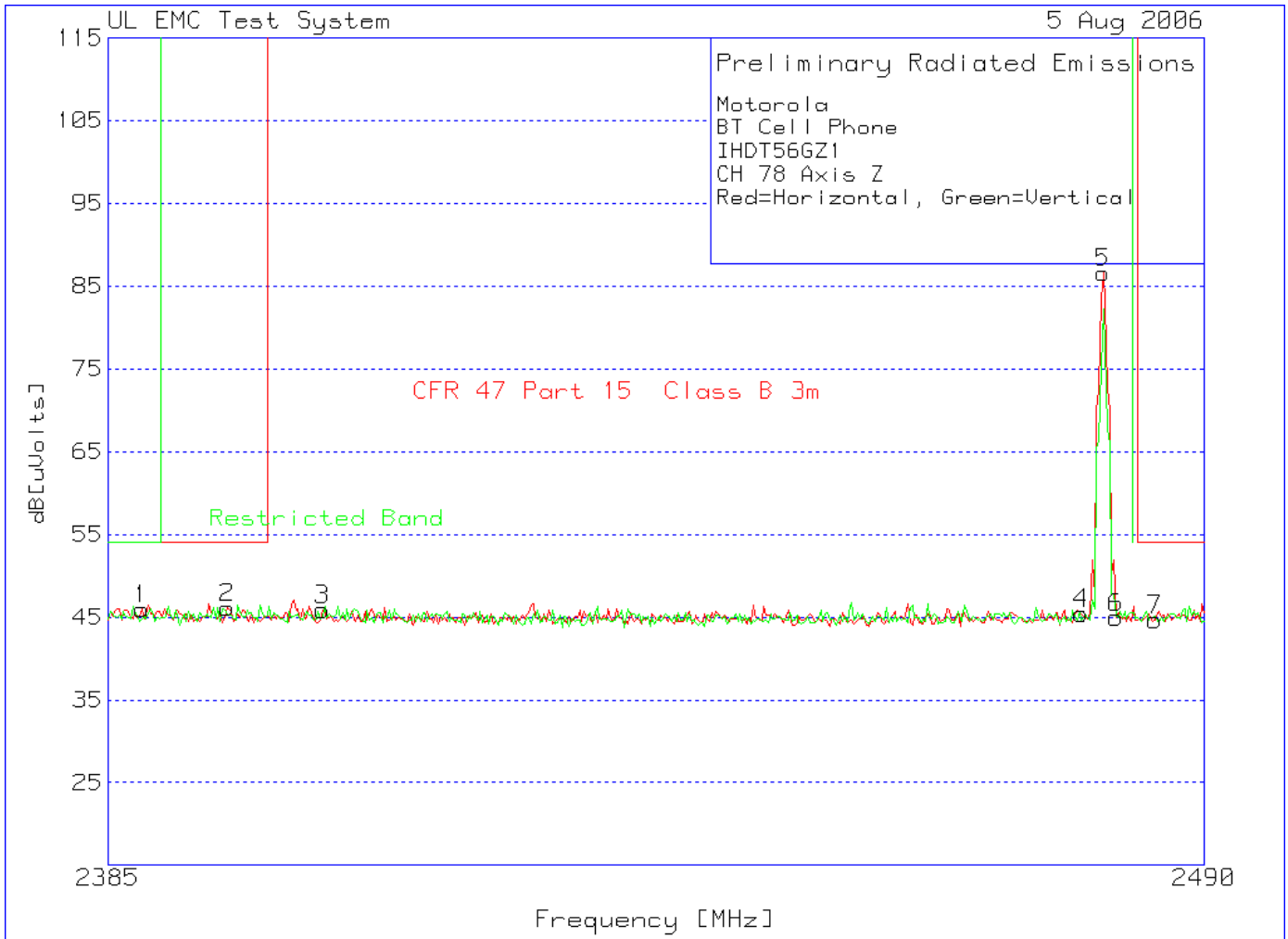
Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 Cell Phone (Inband)
Requirement : CFR 47 Part 15 Class B
Detection Mode : Peak (pk)
Bandwidth : 1 MHz
Measurement Distance : 3 meter
Antenna Type : 2-4GHz Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: August 5, 2006

Manufacturer : Motorola Inc.
Equipment Under Test : IHDT56GZ1 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



APPENDIX C

BT Operating Instructions provided by Motorola in an e-mail communication dated August 1, 2006.
For confidentiality reasons the information is not provided and it is available upon authorized
request.