

# TEST REPORT



Certification # 1367-01

Laboratory ID

PRODUCT SAFETY ENGINEERING, INC.  
12955 Bellamy Brothers Boulevard  
Dade City, Florida 33525 USA  
PH (352) 588-2209 FX (352) 588-2544

Submitter ID

XM Radio  
7777 Glades Road  
Boca Raton, FL 33434

Report Issue Date: 31 Aug 04  
Sample S/N: 50KR50CW  
Sample Receipt Date: August 23, 2004  
Sample Test Date: see data sheets

Test Report Number: 04F394B  
Model Designation: Sky Fi 2  
Product Description: Satellite Radio Receiver  
Marketing Approval \_\_\_\_\_

Description of non-standard test method or test practice: *None*

Estimated Measurement Uncertainty: *Not Applicable*

Special limitations of use: *None*

Traceability: *reference standards of measurement have been calibrated by a competent body using standards traceable to the NIST.*

According to testing performed at Product Safety Engineering, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in regulations indicated on page (3) of the test report. The test results contained herein relate only to the model(s) identified above. 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 Project Engineer, I hereby declare that the equipment tested as specified above conforms to the requirements indicated on page (3) of the test report.

Signature *David Foerstner* Name David Foerstner

Title Engineering Group Leader Date 30 AUG 04

Reviewed by: *John E. Hale* Date 31 Aug 04  
Approved Signatory

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Test Report Number 04F394B

Product Safety Engineering, Inc. 12955 Bellamy Brothers Blvd. Dade City, FL 33525  
Tel (352) 588-2209 Fax (352) 588-2544

## DIRECTORY - EMISSIONS

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|    | Test Regulations                       | 3                   |
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|    | Test-setups (Photos)                   | 11 - 12             |
| B) | Test data                              |                     |
|    | Conducted emissions                    | 10/150 kHz - 30 MHz |
|    |                                        | 5, 9                |
|    | Radiated emissions                     | 10 kHz - 30 MHz     |
|    |                                        | 5, 9                |
|    | Radiated emissions                     | 30 MHz - 1000 MHz   |
|    |                                        | 6, 9                |
|    | Interference power                     | 30 MHz - 300 MHz    |
|    |                                        | 6, 9                |
|    | Equivalent Radiated emissions          | 1 GHz - 18 GHz      |
|    |                                        | 7, 9                |
|    | Antenna Disturbance Voltage            | 30 MHz - 1,000 MHz  |
|    |                                        | 7,9                 |
| C) | Appendix A                             |                     |
|    | Test Equipment Calibration Information | A2                  |
|    | Test Data Sheets                       | A3 - A14            |
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|    | Measurement Protocol                   | C1 - C2             |

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## EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- ☐ - EN 61000-6-3:2001
- ☐ - EN 61000-6-4:2001
- ☐ - EN 55011 : 1998 / A1:1999
  - ☐ - Group 1
  - ☐ - Class A
- ☐ - EN 55013 : 1990 / A12:1994 / A13:1996 / A14:1999
  - ☐ - Group 2
  - ☐ - Class B
- ☐ - EN 55014 -1: 2001
  - ☐ - Household appliances and similar
  - ☐ - Portable tools
  - ☐ - Semiconductor devices
- ☐ - EN 55022 : 1998
  - ☐ - Class A
  - ☐ - Class B
- ☐ -AS/NZS 3548:1995
  - ☐ - Class A
  - ☐ - Class B
- ☐ - ICES-003
  - ☐ - Class A
  - ☐ - Class B
- ☐ - CNS 13438
  - ☐ - Class A
  - ☐ - Class B
- ☐ - VCCI : 1999
  - ☐ - Class A
  - ☐ - Class B
- ☒ - FCC Part 15
  - ☐ - Class A
  - ☒ - Class B
  - ☒ - Certification
  - ☐ - Verification
  - ☐ - Declaration of Conformity
- ☐ - FCC Part 18

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### Environmental conditions during testing:

|                       | LAB   | OATS    |
|-----------------------|-------|---------|
| Temperature: *        | _____ | : _____ |
| Relative Humidity: ** | _____ | : _____ |

\* The ambient temperature during the testing was within the range of (50° - 104° F) unless indicted above.

\*\* The humidity levels during the testing was within the range of (10% - 90%) relative humidity unless indicated above.

Power supply system : 120 Volts 60 Hz SINGLE phase

### Sign Explanations:

- ☐ - not applicable
- ☒ - applicable

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## Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - Test not applicable

- ☐ - Darby Test Site (Open Area Test Site)
- ☒ - Darby Laboratory

### Test equipment used :

|                                       | Model Number | Manufacturer       | Description        | Serial Number  |
|---------------------------------------|--------------|--------------------|--------------------|----------------|
| <input checked="" type="checkbox"/> - | 8028-50      | Solar              | 50 $\Omega$ LISN   | 829012, 829022 |
| <input type="checkbox"/> -            | 3825/2       | Solar              | 50 $\Omega$ LISN   | 924840         |
| <input checked="" type="checkbox"/> - | EMC-30       | Electro-Metrics    | EMI Receiver       | 191            |
| <input type="checkbox"/> -            | 8566B        | Hewlett-Packard    | Spectrum Analyzer  | 2421A00526     |
| <input type="checkbox"/> -            | 85650A       | Hewlett-Packard    | Quasi-Peak Adapter | 2043A00209     |
| <input type="checkbox"/> -            | 85662A       | Hewlett Packard    | Analyzer Display   | 2403A07352     |
| <input type="checkbox"/> -            | 8028-50      | Solar              | 50 $\Omega$ LISN   | 903725, 903726 |
| <input type="checkbox"/> -            | FCC-TLISN-T4 | Fisher Custom Com. | Telecom ISN        | 20072          |

## Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

- ☐ - Darby Test Site (Open Area Test Site)
- ☐ -
- ☐ -

### at a test distance of :

- ☐ - 3 meters
- ☐ - 30 meters

☒ - Test not applicable

### Test equipment used :

|                            | Model Number | Manufacturer     | Description          | Serial Number |
|----------------------------|--------------|------------------|----------------------|---------------|
| <input type="checkbox"/> - | 96005        | Eaton            | Log Periodic Antenna | 1099          |
| <input type="checkbox"/> - | BIA-25       | Electro-Metrics  | Biconical Antenna    | 4283          |
| <input type="checkbox"/> - | 8566B        | Hewlett-Packard  | Spectrum Analyzer    | 2421A00526    |
| <input type="checkbox"/> - | 85662A       | Hewlett-Packard  | Analyzer Display     | 2403A07352    |
| <input type="checkbox"/> - | 85650A       | Hewlett-Packard  | Quasi-Peak Adapter   | 2043A00209    |
| <input type="checkbox"/> - | ALR-30M      | Electro-Metrics  | Loop Antenna         | 824           |
| <input type="checkbox"/> - | 8447D        | Hewlett Packard  | Preamplifier         | 2944A06832    |
| <input type="checkbox"/> - | EMC-30       | Electro-Metrics  | EMI Receiver         | 191           |
| <input type="checkbox"/> - | ALA-130/A    | Antenna Research | Loop Antenna         | 106           |

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## Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1071 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - Test not applicable

- ☒ - Darby Site (Open Area Test Site)
- ☐ - Darby Lab
- ☐ -

at a test distance of :

- ☒ - 3 meters
- ☐ - 10 meters
- ☐ - 30 meters

Test equipment used :

|                                     | Model Number | Manufacturer     | Description          | Serial Number |
|-------------------------------------|--------------|------------------|----------------------|---------------|
| <input checked="" type="checkbox"/> | LPA30        | eElectro-Metrics | Log Periodic Antenna | 2280          |
| <input checked="" type="checkbox"/> | BIA-30       | Electro-Metrics  | Biconical Antenna    | 3852          |
| <input checked="" type="checkbox"/> | 8566B        | Hewlett-Packard  | Spectrum Analyzer    | 2421A00526    |
| <input checked="" type="checkbox"/> | 85662A       | Hewlett-Packard  | Analyzer Display     | 2403A07352    |
| <input checked="" type="checkbox"/> | 85650A       | Hewlett-Packard  | Quasi-Peak Adapter   | 2043A00209    |
| <input checked="" type="checkbox"/> | 8447D        | Hewlett-Packard  | Preamplifier (26dB)  | 2944A06832    |
| <input type="checkbox"/>            | EMC-30       | Electro-Metrics  | EMI Receiver         | 191           |
| <input type="checkbox"/>            | 8568B        | Hewlett Packard  | Spectrum Analyzer    | 2407A03213    |
| <input type="checkbox"/>            | 85650A       | Hewlett Packard  | Quasi-Peak Adapter   | 2043A00358    |
| <input type="checkbox"/>            | 85662A       | Hewlett Packard  | Analyzer Display     | 2340A05806    |
| <input type="checkbox"/>            | 96005        | Eaton            | Log Periodic         | 1099          |
| <input type="checkbox"/>            | BIA 25       | Electro-Metrics  | Biconical Antenna    | 4283          |

## Emissions Test Conditions): INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

☒ - Test not applicable

- ☐ - Darby Lab
- ☐ -

Test equipment used :

|                          | Model Number | Manufacturer    | Description        | Serial Number |
|--------------------------|--------------|-----------------|--------------------|---------------|
| <input type="checkbox"/> | MDS-21       | Rhode&Schwarz   | Absorbing Clamp    | 8608447020    |
| <input type="checkbox"/> | 8566B        | Hewlett-Packard | Spectrum Analyzer  | 2421A00526    |
| <input type="checkbox"/> | 85662A       | Hewlett-Packard | Analyzer Display   | 2403A07352    |
| <input type="checkbox"/> | 85650A       | Hewlett-Packard | Quasi-Peak Adapter | 2043A00209    |
| <input type="checkbox"/> | 8447D        | Hewlett-Packard | Amplifier (26 dB)  | 2944A06832    |
| <input type="checkbox"/> | EMC-30       | Electro-Metrics | EMI Receiver       | 191           |

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The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range      GHz -      GHz  
were performed in a horizontal and vertical polarization at the following test location :

- ☐ - Darby Test Site (Open Area Test Site)
- ☐ -
- ☐ -
- ☐ -

at a test distance of:

- ☐ - 1 meters
- ☐ - 3 meters
- ☐ - 10 meters

■ - Test not applicable

Test equipment used :

|                            | Model Number | Manufacturer      | Description             | Serial Number |
|----------------------------|--------------|-------------------|-------------------------|---------------|
| <input type="checkbox"/> - | 8566B        | Hewlett-Packard   | Spectrum Analyzer       | 2421A00526    |
| <input type="checkbox"/> - | 85662A       | Hewlett-Packard   | Analyzer Display        | 2403A07352    |
| <input type="checkbox"/> - | 85650A       | Hewlett-Packard   | Quasi-Peak Adapter      | 2043A00209    |
| <input type="checkbox"/> - | 8449B        | Hewlett-Packard   | Preamplifier            | 3008A00320    |
| <input type="checkbox"/> - | 3115         | Electro-Mechanics | Double Ridge Guide Horn | 3810          |

The *ANTENNA TERMINAL DISTURBANCE VOLTAGE* in the frequency range 30 MHz - 1,000 MHz were performed.

- ☐ - Darby Test Site (Open Area Test Site)
- ☐ - Laboratory
- ☐ -
- ☐ -

■ - Test not applicable

|                            | Model Number | Manufacturer    | Description                 | Serial Number |
|----------------------------|--------------|-----------------|-----------------------------|---------------|
| <input type="checkbox"/> - | 2F9-3C4-3C5  | Wavecom         | UHF PAL TV Modulator        | 185879        |
| <input type="checkbox"/> - | 2F1-3C4-3C5  | Wavecom         | VHF PAL TV Modulator        | 157728        |
| <input type="checkbox"/> - | A-8000       | IFR             | Spectrum Analyzer           | 1306          |
| <input type="checkbox"/> - | 8648B        | Hewlett-Packard | Signal Generator            | 3623A01433    |
| <input type="checkbox"/> - | 8648B        | Hewlett-Packard | Signal Generator            | 3623A01477    |
| <input type="checkbox"/> - | LMV-182A     | Leader          | RMS Milli-Voltmeter         | 8010091       |
| <input type="checkbox"/> - | 3202         | Krhon-Hite      | Active filter               | 5899          |
| <input type="checkbox"/> - | FMT115       | Leaming         | FM Modulator                | NONE          |
| <input type="checkbox"/> - | 371          | UDT             | Optical power meter         | 06657         |
| <input type="checkbox"/> - | TSG95        | Tektronix       | PAL video / Audio generator | B028883       |
| <input type="checkbox"/> - |              |                 |                             |               |

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## Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☐ - Practice operation
- ☒ - Normal Operating Mode
- ☐ -

## Configuration of the device under test:

- ☒ - See System Under Test Information in Appendix B

## Rationale for EUT setup / configuration:

*ANSI C63.4*

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## Emission Test Results:

### Conducted emissions 150 kHz - 30 MHz

The requirements are ☒ - MET ☐ - NOT MET  
Minimum limit margin 5.0 dB at 0.15 MHz  
Remarks:

### Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are ☐ - MET ☐ - NOT MET  
Minimum limit margin dB at MHz  
Remarks:

### Radiated emissions (electric field) 30 MHz - 1071 MHz

The requirements are ☒ - MET ☐ - NOT MET  
Minimum limit margin 0.9 dB at 88.7 MHz  
Remarks:

### Interference Power at the mains and interface cables 30 MHz - 300 MHz

The requirements are ☐ - MET ☐ - NOT MET  
Minimum limit margin dB at MHz  
Remarks:

### Radiated emissions GHz - GHz

The requirements are ☐ - MET ☐ - NOT MET  
Minimum limit margin dB at GHz  
Remarks:

### Antenna Terminal Disturbance Voltage 30 MHz - 1,000 MHz

The requirements are ☐ - MET ☐ - NOT MET  
Minimum limit margin dB at MHz  
Remarks:

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## GENERAL REMARKS:

The EUT was tested in (3) orthogonal positions. The worst case data is reflected in the test report.

## SUMMARY:

The requirements according to the technical regulations are

■ - met

□ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

□ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date August 23, 2004

Testing End Date: August 23, 2004

- PRODUCT SAFETY ENGINEERING INC -

*Test Report Number 04F394B*

Test-setup photo(s):  
Conducted emission 150 kHz - 30 MHz



*Test Report Number 04F394B*

Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525  
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Test-setup photo(s):  
Radiated emission 30 MHz - 1071 MHz



*Test Report Number 04F394B*

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# **APPENDIX**

## **A**

### **Test Equipment Calibration Information & Test Data Sheets**

## TEST EQUIPMENT CALIBRATION INFORMATION

| Manufacturer      | Model     | Description             | Serial Number | Cal Due  |
|-------------------|-----------|-------------------------|---------------|----------|
| Hewlett Packard   | 8566B     | Spectrum Analyzer       | 2421A00526    | 08/12/05 |
| Hewlett Packard   | 85662A    | Display                 | 2403A07352    | 08/12/05 |
| Hewlett Packard   | 85650A    | Quasi-Peak Adapter      | 2043A00209    | 08/12/05 |
| Hewlett Packard   | 8447D     | Preamp 0.1 - 1,000 MHz  | 2944A06832    | 12/10/04 |
| Hewlett Packard   | 8568B     | Spectrum Analyzer       | 2407A03213    | 08/12/05 |
| Hewlett Packard   | 85662A    | Display                 | 2340A05806    | 08/12/05 |
| Hewlett Packard   | 85650A    | Quasi-Peak Adapter      | 2043A00358    | 08/12/05 |
| Hewlett Packard   | 8447D     | Preamp 0.1 - 1,000 MHz  | 2944A06901    | 08/12/05 |
| Hewlett Packard   | 8447D     | Preamp 0.1 - 1,000 MHz  | 1937A03247    | 08/12/05 |
| Hewlett Packard   | 8449B     | Preamp 1 - 26.5 GHz     | 3008A00320    | 12/02/04 |
| Hewlett Packard   | 8648B     | Signal Generator        | 3443U00312    | 05/04/05 |
| Hewlett Packard   | 8672A     | Signal Generator        | 2211A02426    | 10/17/04 |
| Eaton             | 96005     | Log Periodic Antenna    | 1099          | 02/05/05 |
| Electro-Metrics   | LPA 30    | Log Periodic Antenna    | 2280          | 01/12/05 |
| Electro-Metrics   | BIA 30    | Biconical Antenna       | 3852          | 01/13/05 |
| Electro-Metrics   | BIA 25    | Biconical Antenna       | 4283          | 02/04/05 |
| Electro-Mechanics | 3115      | Double Ridge Guide Ant. | 3810          | 11/25/05 |
| Electro-Metrics   | ALR30M    | Magnetic Loop Antenna   | 824           | 01/12/05 |
| Solar             | 8012      | LISN                    | 924840        | 12/24/04 |
| Solar             | 8028      | LISN                    | 829012/809022 | 12/12/04 |
| Solar             | 8028      | LISN                    | 903725/903726 | 12/01/04 |
| Schwartzbeck      | MDS-21    | Absorbing Clamp         | 02581         | 09/18/04 |
| Leader            | LFG1310   | Function Generator      | 8060233       | 05/04/05 |
| IFR Systems       | A-8000    | Spectrum Analyzer       | 1306          | 12/08/04 |
| Electro-Metrics   | EMC-30    | EMI Receiver            | 191           | 05/04/05 |
| Antenna Research  | ALA-130/A | Loop Antenna            | 106           | 05/03/05 |
| Radio Shack       | 63-867    | Temp/Hygrometer         | N/A           | 05/04/05 |
| Radio Shack       | 63-867A   | Temp/Hygrometer         | N/A           | 05/04/05 |

# PRODUCT EMISSIONS

PRODUCT SAFETY ENGINEERING

Data File: XM RADIO "HOME" FCC FINAL 8-23-04

| No | EMISSION         | SPEC<br>LIMIT | MEASUREMENTS |       |      | POL | SITE |     | CORR<br>FACTOR | COMMENTS        |
|----|------------------|---------------|--------------|-------|------|-----|------|-----|----------------|-----------------|
|    | FREQUENCY<br>MHz |               | ABS          | dLIM  | MODE |     | HGT  | AZM |                |                 |
|    |                  |               | dBuV/m       | dB    |      |     | cm   | deg | dB             |                 |
| 1  | 88.713           | 43.5          | 45.6         | 2.1   | PK   | V   | 100  | 45  | -19.6          | LIMIT=48 dBuV/M |
| 2  | 107.105          | 43.5          | 46.7         | 3.2   | QP   | V   | 100  | 90  | -15.2          | LIMIT=48 dBuV/M |
| 3  | 177.400          | 43.5          | 37.9         | -5.6  | PK   | V   | 125  | 90  | -10.6          |                 |
| 4  | 214.214          | 43.5          | 30.6         | -12.9 | PK   | V   | 125  | 90  | -13.2          |                 |
| 5  | 266.400          | 46.0          | 34.7         | -11.3 | PK   | H   | 125  | 1   | -12.3          |                 |
| 6  | 321.279          | 46.0          | 26.1         | -19.9 | PK   | H   | 125  | 180 | -10.5          |                 |
| 7  | 355.100          | 46.0          | 22.9         | -23.1 | PK   | H   | 125  | 1   | -10.4          |                 |
| 8  | 428.449          | 46.0          | 25.2         | -20.8 | PK   | H   | 100  | 180 | -9.2           |                 |
| 9  | 443.500          | 46.0          | 18.3         | -27.7 | PK   | H   | 125  | 1   | -8.9           |                 |
| 10 | 532.200          | 46.0          | 26.2         | -19.8 | PK   | H   | 125  | 1   | -7.7           |                 |
| 11 | 535.500          | 46.0          | 31.5         | -14.5 | PK   | H   | 100  | 180 | -7.7           |                 |
| 12 | 620.900          | 46.0          | 26.2         | -19.8 | PK   | H   | 125  | 1   | -6.4           |                 |
| 13 | 642.600          | 46.0          | 27.3         | -18.7 | PK   | H   | 100  | 180 | -5.8           |                 |
| 14 | 709.600          | 46.0          | 22.3         | -23.7 | PK   | H   | 125  | 1   | -3.4           |                 |
| 15 | 749.700          | 46.0          | 22.0         | -24.1 | PK   | H   | 100  | 180 | -3.5           |                 |
| 16 | 798.300          | 46.0          | 23.4         | -22.6 | PK   | H   | 125  | 1   | -3.4           |                 |
| 17 | 856.800          | 46.0          | 28.0         | -18.0 | PK   | H   | 100  | 180 | -2.1           |                 |
| 18 | 887.000          | 46.0          | 25.0         | -21.0 | PK   | H   | 125  | 1   | -1.3           |                 |
| 19 | 963.900          | 54.0          | 26.7         | -27.3 | PK   | H   | 100  | 180 | 0.9            |                 |
| 20 | 975.700          | 54.0          | 26.2         | -27.8 | PK   | H   | 100  | 180 | 1.1            |                 |
| 21 | 1000.00          | 54.0          | 26.9         | -27.1 | PK   | H   | 100  | 180 | 1.5            | Mkr @ 1071 MHz  |

A3

# PRODUCT EMISSIONS

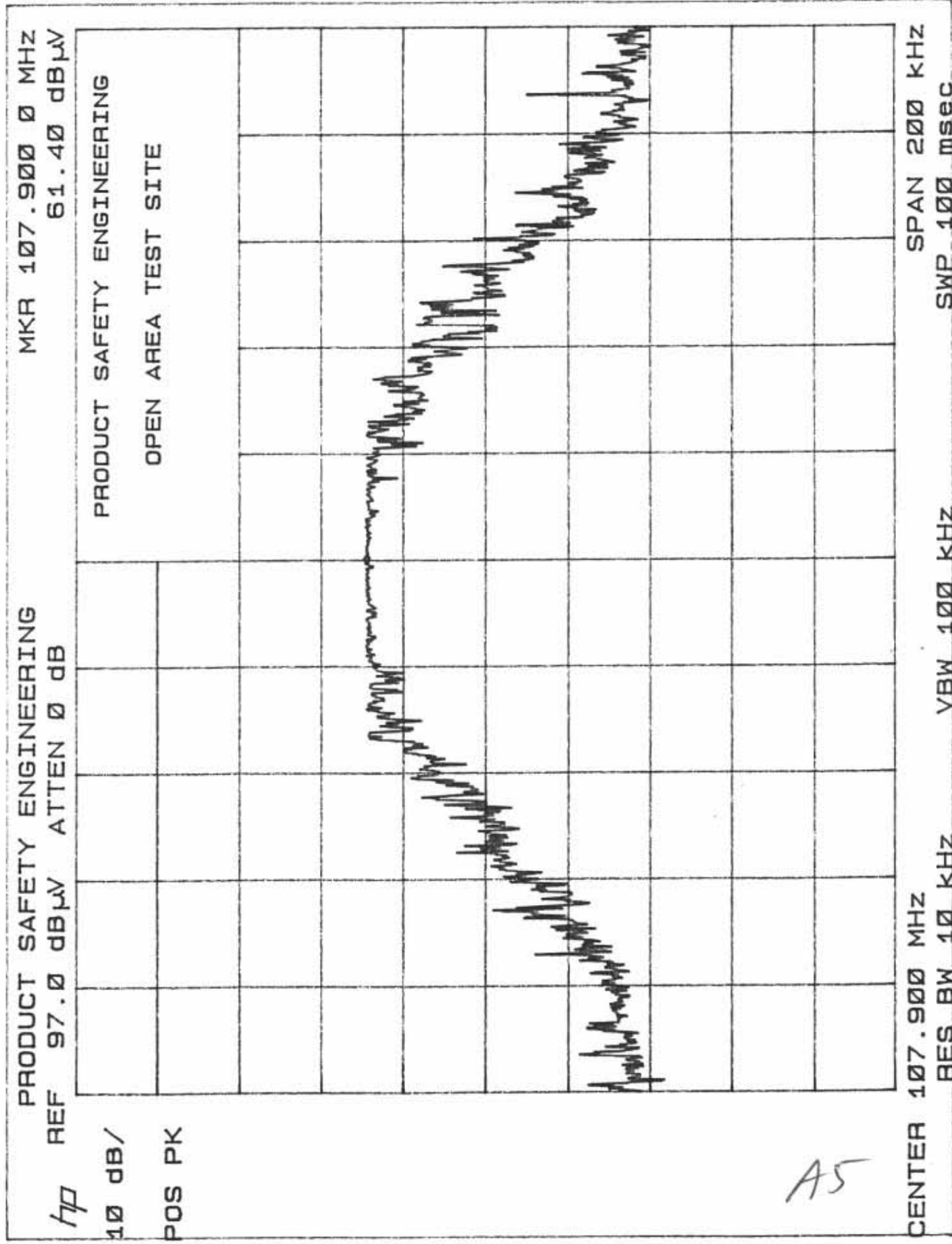
PRODUCT SAFETY ENGINEERING

Data File: XM RADIO "MOBILE" FCC FINAL 8/23

| No | EMISSION<br>FREQUENCY<br>MHz | SPEC<br>LIMIT<br>dBuV/m | MEASUREMENTS |       |      | POL | SITE      |            | CORR<br>FACTOR<br>dB | COMMENTS        |
|----|------------------------------|-------------------------|--------------|-------|------|-----|-----------|------------|----------------------|-----------------|
|    |                              |                         | ABS          | dLIM  | MODE |     | HGT<br>cm | AZM<br>deg |                      |                 |
| 1  | 88.704                       | 43.5                    | 47.1         | 3.6   | QP   | V   | 100       | 1          | -19.6                | LIMIT=48 dBuV/M |
| 2  | 107.096                      | 43.5                    | 46.7         | 3.2   | QP   | V   | 100       | 1          | -15.2                | LIMIT=48 dBuV/M |
| 3  | 214.214                      | 43.5                    | 25.0         | -18.5 | PK   | V   | 100       | 45         | -13.2                |                 |
| 4  | 266.400                      | 46.0                    | 34.7         | -11.3 | PK   | H   | 125       | 1          | -12.3                |                 |
| 5  | 321.279                      | 46.0                    | 26.1         | -19.9 | PK   | H   | 125       | 180        | -10.5                |                 |
| 6  | 355.100                      | 46.0                    | 22.9         | -23.1 | PK   | H   | 125       | 1          | -10.4                |                 |
| 7  | 428.449                      | 46.0                    | 25.2         | -20.8 | PK   | H   | 100       | 180        | -9.2                 |                 |
| 8  | 443.500                      | 46.0                    | 18.3         | -27.7 | PK   | H   | 125       | 1          | -8.9                 |                 |
| 9  | 532.200                      | 46.0                    | 26.2         | -19.8 | PK   | H   | 125       | 1          | -7.7                 |                 |
| 10 | 535.500                      | 46.0                    | 31.5         | -14.5 | PK   | H   | 100       | 180        | -7.7                 |                 |
| 11 | 620.900                      | 46.0                    | 26.2         | -19.8 | PK   | H   | 125       | 1          | -6.4                 |                 |
| 12 | 642.600                      | 46.0                    | 30.0         | -16.0 | PK   | H   | 200       | 45         | -5.8                 |                 |
| 13 | 709.600                      | 46.0                    | 22.3         | -23.7 | PK   | H   | 125       | 1          | -3.4                 |                 |
| 14 | 749.700                      | 46.0                    | 22.0         | -24.1 | PK   | H   | 100       | 180        | -3.5                 |                 |
| 15 | 798.300                      | 46.0                    | 23.4         | -22.6 | PK   | H   | 125       | 1          | -3.4                 |                 |
| 16 | 856.800                      | 46.0                    | 28.0         | -18.0 | PK   | H   | 100       | 180        | -2.1                 |                 |
| 17 | 887.000                      | 46.0                    | 25.0         | -21.0 | PK   | H   | 125       | 1          | -1.3                 |                 |
| 18 | 963.900                      | 54.0                    | 26.7         | -27.3 | PK   | H   | 100       | 180        | 0.9                  |                 |
| 19 | 975.700                      | 54.0                    | 26.2         | -27.8 | PK   | H   | 100       | 180        | 1.1                  |                 |
| 20 | 1000.00                      | 54.0                    | 26.9         | -27.1 | PK   | H   | 100       | 180        | 1.5                  | Mkr @ 1071 MHz  |

A4

XM RADIO BANDWIDTH PLOT @ 107.9 MHz



# XM RADIO BANDWIDTH PLOT @ 88.1 MHz

PRODUCT SAFETY ENGINEERING

MKR 88.100 0 MHz

REF 97.0 dBμV ATTN 0 dB

60.60 dBμV

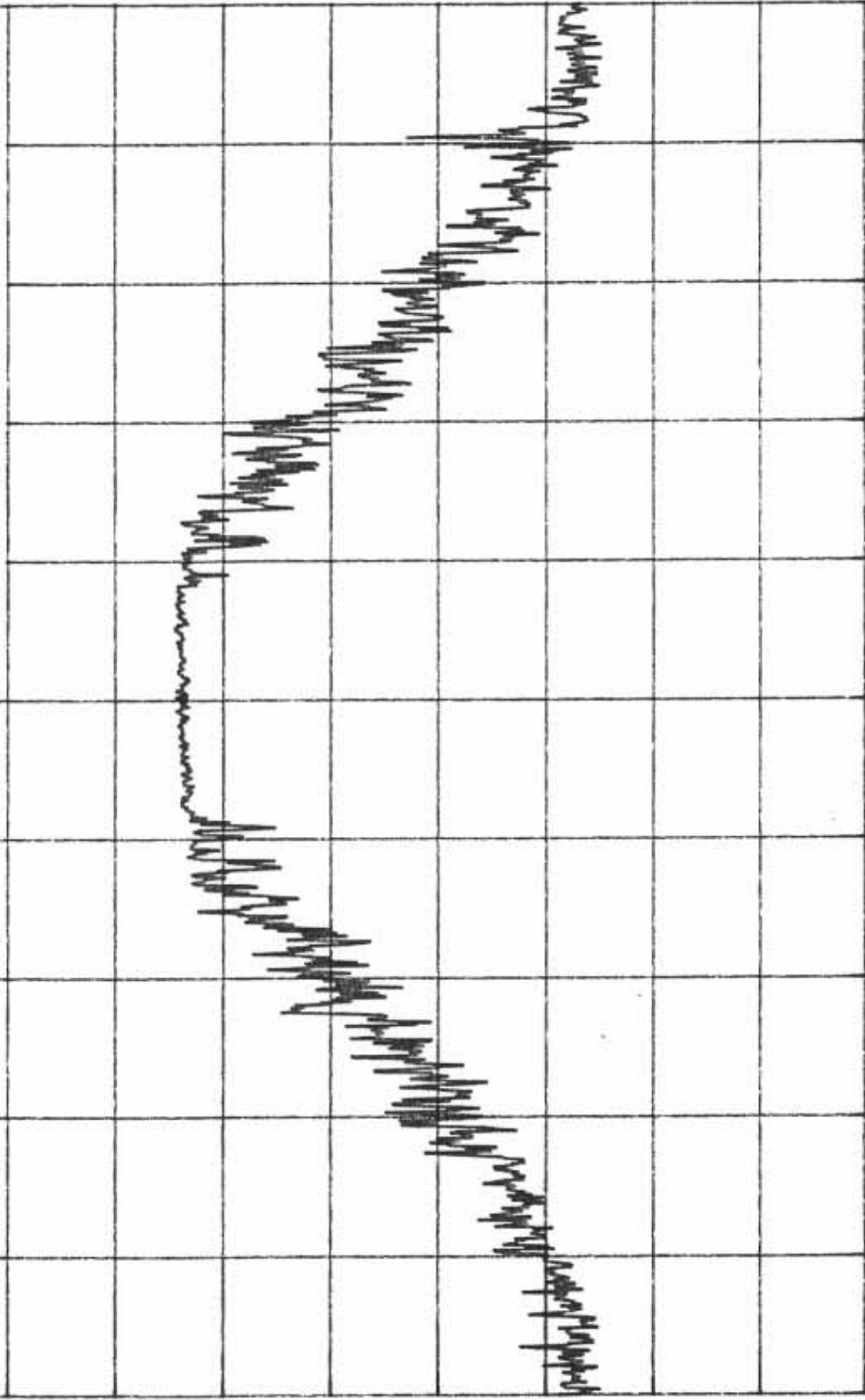
HP

10 dB/

POS PK

PRODUCT SAFETY ENGINEERING

OPEN AREA TEST SITE



AB

START 88.000 MHz

STOP 88.200 MHz

RES BW 10 KHz

VBW 100 KHz

SWP 100 msec

# Product Safety Engineering

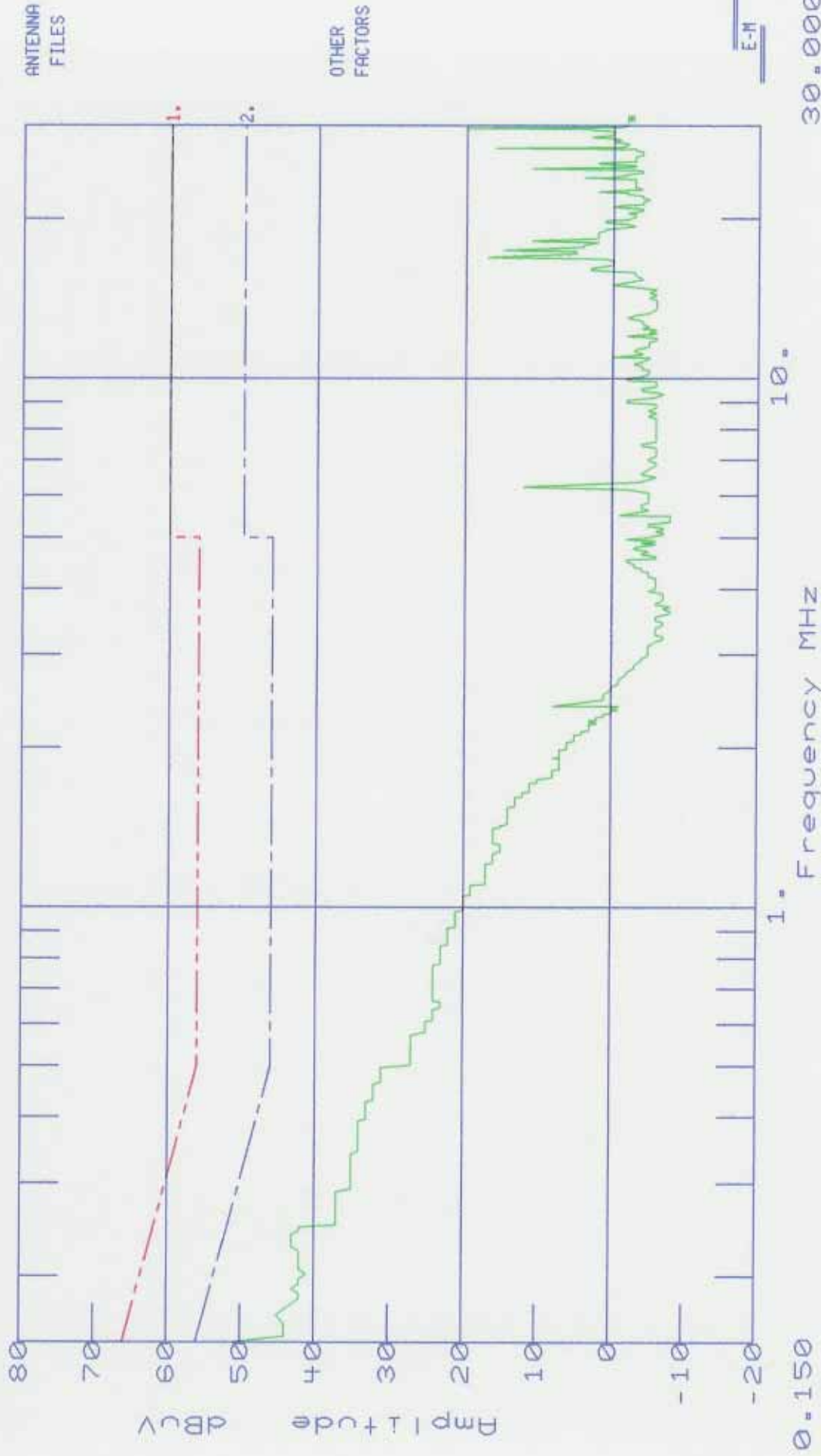
XM RADIO

Date : 08/23/04  
 Technician : CHIP FOERSTNER  
 Test Method : EN55022 CLASS B  
 Equipment : SA10101  
 Mode of Op. : TX @ 107.1 MHZ  
 Serial No. : 50KR50CU  
 Time : 16:32:08.68  
 Test Equip. : EMC-30  
 Test Number : 1  
 Sensor Loc. : LINE  
 Sensor Pol. :  
 Ext. Atten. : 0 dB

Comment : POWER SUPPLY CUI MODEL 41-6-1000D 120VAC/60HZ

EMC-30 SETTINGS  
 Detector QuasiPeak  
 Bandwidth CISPR  
 Dump/Dwell IN/A  
 RF Atten. 10 dB  
 IF Atten. 10 dB

SPECS  
 1) CISPR 22 Quasi Peak  
 2) CISPR 22 AVG  
 3)  
 4)



A7

TEST TITLE:XM RADIO  
DATA FILE :XM107\_L.D30  
Amplitude Units : dBuV

Threshold -13 dB

PAGE 1  
Freq.(MHz)  
0.1500

| Freq(MHz) | Amp  | C22BQP.S30<br>vs Spec(dB) | C22BAVG.S30<br>vs Spec(dB) |
|-----------|------|---------------------------|----------------------------|
| 0.1500    | 51.0 |                           | -5.000 *                   |
| 0.1542    | 44.0 |                           | -11.771 *                  |
| 0.1583    | 44.0 |                           | -11.553 *                  |
| 0.1625    | 44.0 |                           | -11.335 *                  |
| 0.1689    | 45.0 |                           | -10.014 *                  |
| 0.1730    | 44.0 |                           | -10.815 *                  |
| 0.1770    | 43.0 |                           | -11.625 *                  |
| 0.1812    | 42.0 |                           | -12.430 *                  |
| 0.1854    | 42.0 |                           | -12.240 *                  |
| 0.1892    | 43.0 |                           | -11.072 *                  |
| 0.1933    | 42.0 |                           | -11.894 *                  |
| 0.1975    | 42.0 |                           | -11.715 *                  |
| 0.2021    | 41.0 |                           | -12.524 *                  |
| 0.2062    | 42.0 |                           | -11.357 *                  |
| 0.2104    | 42.0 |                           | -11.190 *                  |
| 0.2145    | 42.0 |                           | -11.029 *                  |
| 0.2187    | 42.0 |                           | -10.868 *                  |
| 0.2228    | 42.0 |                           | -10.714 *                  |
| 0.2274    | 43.0 |                           | -9.544 *                   |
| 0.2316    | 43.0 |                           | -9.392 *                   |
| 0.2357    | 43.0 |                           | -9.246 *                   |
| 0.2395    | 43.0 |                           | -9.114 *                   |
| 0.2437    | 42.0 |                           | -9.969 *                   |
| 0.2478    | 42.0 |                           | -9.831 *                   |

AB

# Product Safety Engineering

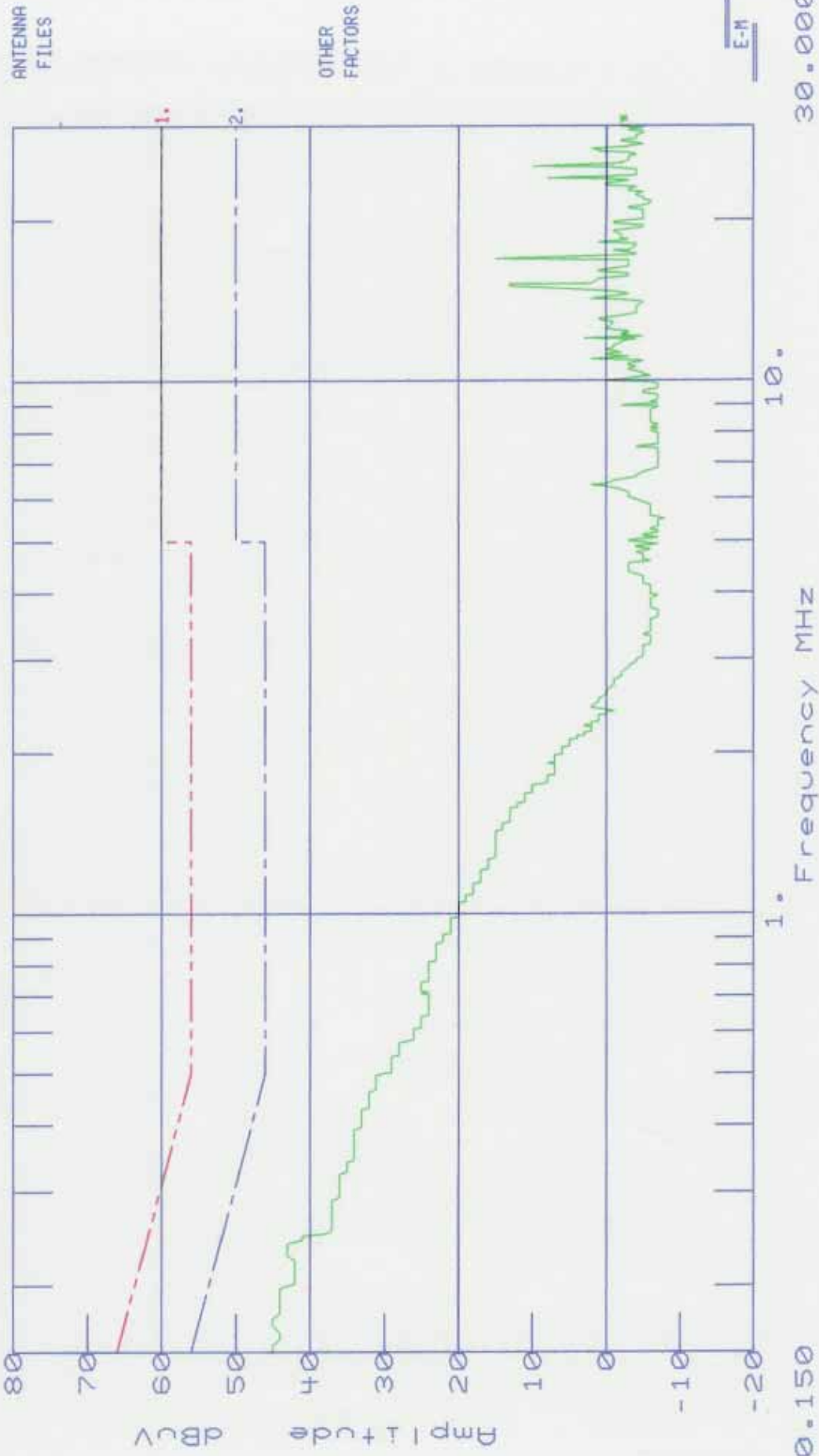
XM RADIO

Date : 08/24/04  
 Technician : CHIP FOERSTNER  
 Test Method : EN5022 CLASS B  
 Equipment : SA10101  
 Mode of Op. : TX @107.1 MHZ  
 Serial No. : 50KR50CW  
 Time : 13:33:59.41  
 Test Equip. : EMC-30  
 Test Number : 1  
 Sensor Loc. : NEUTRAL  
 Sensor Pol. :  
 Ext. Atten. : 0 dB

Comment : POWER SUPPLY CUI MODEL 41-6-1000D 120VAC/60HZ

EMC-30 SETTINGS  
 Detector QuasiPeak  
 Bandwidth CISPR  
 Dump/Dwell IN/A  
 RF Atten. 10 dB  
 IF Atten. 10 dB

SPECS  
 1) CISPR 22 Quasi Peak  
 2) CISPR 22 AVG  
 3)  
 4)



A9

|                        |                  |
|------------------------|------------------|
| TEST TITLE:XM RADIO    | PAGE 1           |
| DATA FILE :XM107_N.D30 | Freq.(MHz)       |
| Amplitude Units : dBuV | Threshold -13 dB |
|                        | 0.1500           |

| Freq(MHz) | Amp  | C22BQP.S30<br>vs Spec(dB) | C22BAVG.S30<br>vs Spec(dB) |
|-----------|------|---------------------------|----------------------------|
| 0.1500    | 45.0 |                           | -11.000 *                  |
| 0.1542    | 45.0 |                           | -10.771 *                  |
| 0.1583    | 44.0 |                           | -11.553 *                  |
| 0.1625    | 44.0 |                           | -11.335 *                  |
| 0.1689    | 45.0 |                           | -10.014 *                  |
| 0.1730    | 45.0 |                           | -9.815 *                   |
| 0.1770    | 44.0 |                           | -10.625 *                  |
| 0.1812    | 44.0 |                           | -10.430 *                  |
| 0.1854    | 44.0 |                           | -10.240 *                  |
| 0.1892    | 44.0 |                           | -10.072 *                  |
| 0.1933    | 44.0 |                           | -9.894 *                   |
| 0.1975    | 44.0 |                           | -9.715 *                   |
| 0.2021    | 42.0 |                           | -11.524 *                  |
| 0.2062    | 42.0 |                           | -11.357 *                  |
| 0.2104    | 42.0 |                           | -11.190 *                  |
| 0.2145    | 42.0 |                           | -11.029 *                  |
| 0.2187    | 42.0 |                           | -10.868 *                  |
| 0.2228    | 42.0 |                           | -10.714 *                  |
| 0.2274    | 43.0 |                           | -9.544 *                   |
| 0.2316    | 43.0 |                           | -9.392 *                   |
| 0.2357    | 43.0 |                           | -9.246 *                   |
| 0.2395    | 43.0 |                           | -9.114 *                   |
| 0.2437    | 41.0 |                           | -10.969 *                  |
| 0.2478    | 41.0 |                           | -10.831 *                  |

A10

# Product Safety Engineering

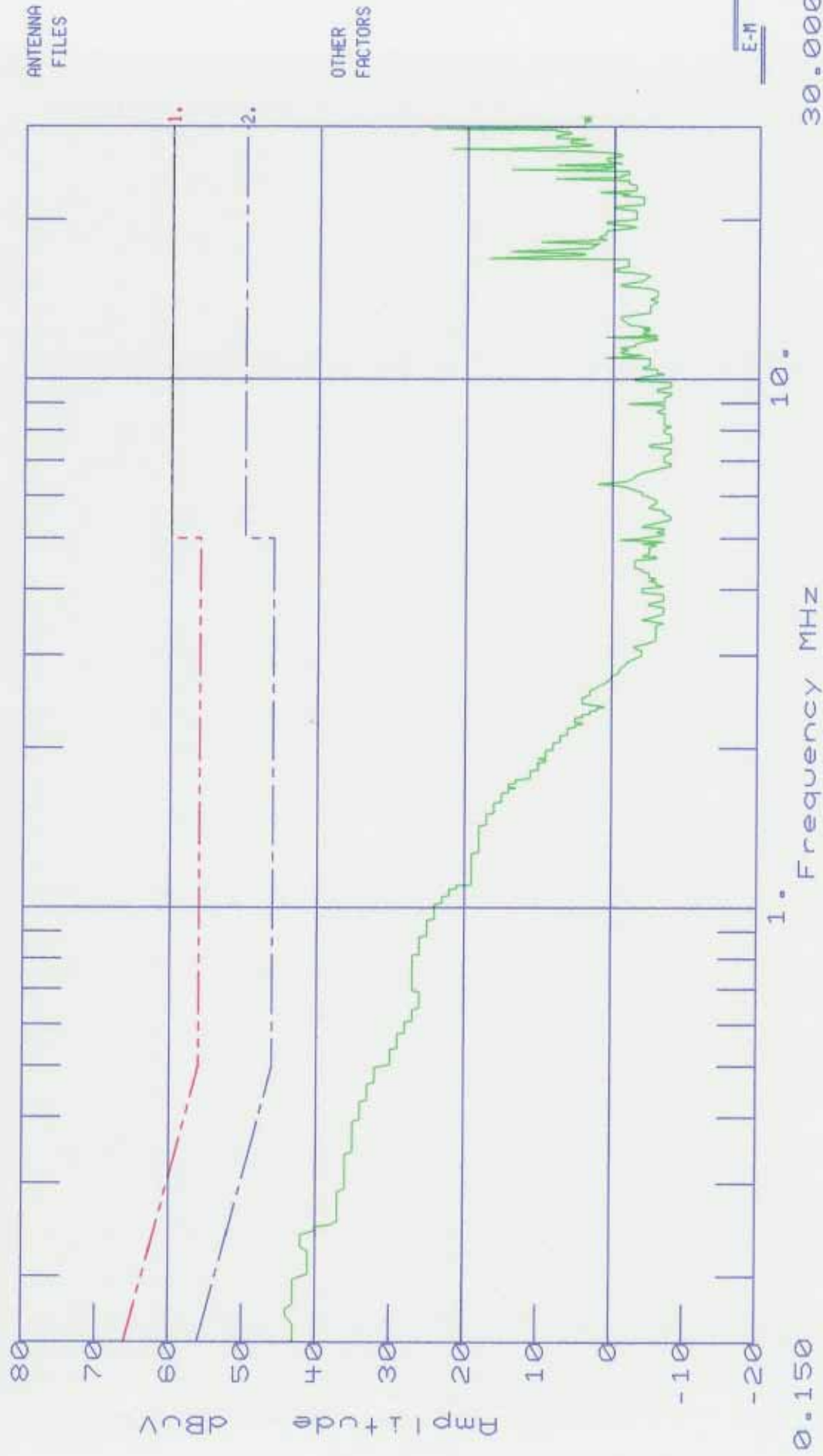
XM RADIO

Date : 08/23/04  
 Technician : CHIP FOERSTNER  
 Test Method : EN55022 CLASS B  
 Equipment : SAI0101  
 Mode of Op. : TX @ 88.7 MHZ  
 Serial No. : 50KR50CU  
 Time : 16:07:49.64  
 Test Equip. : EMC-30  
 Test Number : 1  
 Sensor Loc. : LINE  
 Sensor Pol. :  
 Ext. Atten. : 0 dB

Comment : POWER SUPPLY CUI MODEL 41-6-1000D 120VAC/60HZ

EMC-30 SETTINGS  
 Detector QuasiPeak  
 Bandwidth CISPR  
 Dump/Dwell IN/A  
 RF Atten. 10 dB  
 IF Atten. 10 dB

SPECS  
 1) CISPR 22 Quasi Peak  
 2) CISPR 22 AVG  
 3)  
 4)



AI

|                        |            |
|------------------------|------------|
| TEST TITLE:XM RADIO    | PAGE 1     |
| DATA FILE :XMRAD_L.D30 | Freq.(MHz) |
| Amplitude Units : dBuV | 0.1500     |
| Threshold -13 dB       |            |

| Freq(MHz) | Amp  | C22BQP.S30<br>vs Spec(dB) | C22BAVG.S30<br>vs Spec(dB) |
|-----------|------|---------------------------|----------------------------|
| 0.1500    | 44.0 |                           | -12.000 *                  |
| 0.1542    | 44.0 |                           | -11.771 *                  |
| 0.1583    | 44.0 |                           | -11.553 *                  |
| 0.1625    | 44.0 |                           | -11.335 *                  |
| 0.1689    | 45.0 |                           | -10.014 *                  |
| 0.1730    | 45.0 |                           | -9.815 *                   |
| 0.1770    | 44.0 |                           | -10.625 *                  |
| 0.1812    | 44.0 |                           | -10.430 *                  |
| 0.1854    | 44.0 |                           | -10.240 *                  |
| 0.1892    | 44.0 |                           | -10.072 *                  |
| 0.1933    | 44.0 |                           | -9.894 *                   |
| 0.1975    | 44.0 |                           | -9.715 *                   |
| 0.2021    | 42.0 |                           | -11.524 *                  |
| 0.2062    | 42.0 |                           | -11.357 *                  |
| 0.2104    | 42.0 |                           | -11.190 *                  |
| 0.2145    | 42.0 |                           | -11.029 *                  |
| 0.2187    | 42.0 |                           | -10.868 *                  |
| 0.2228    | 42.0 |                           | -10.714 *                  |
| 0.2274    | 43.0 |                           | -9.544 *                   |
| 0.2316    | 43.0 |                           | -9.392 *                   |
| 0.2357    | 43.0 |                           | -9.246 *                   |
| 0.2395    | 43.0 |                           | -9.114 *                   |
| 0.2437    | 42.0 |                           | -9.969 *                   |
| 0.2478    | 42.0 |                           | -9.831 *                   |

A12

# Product Safety Engineering

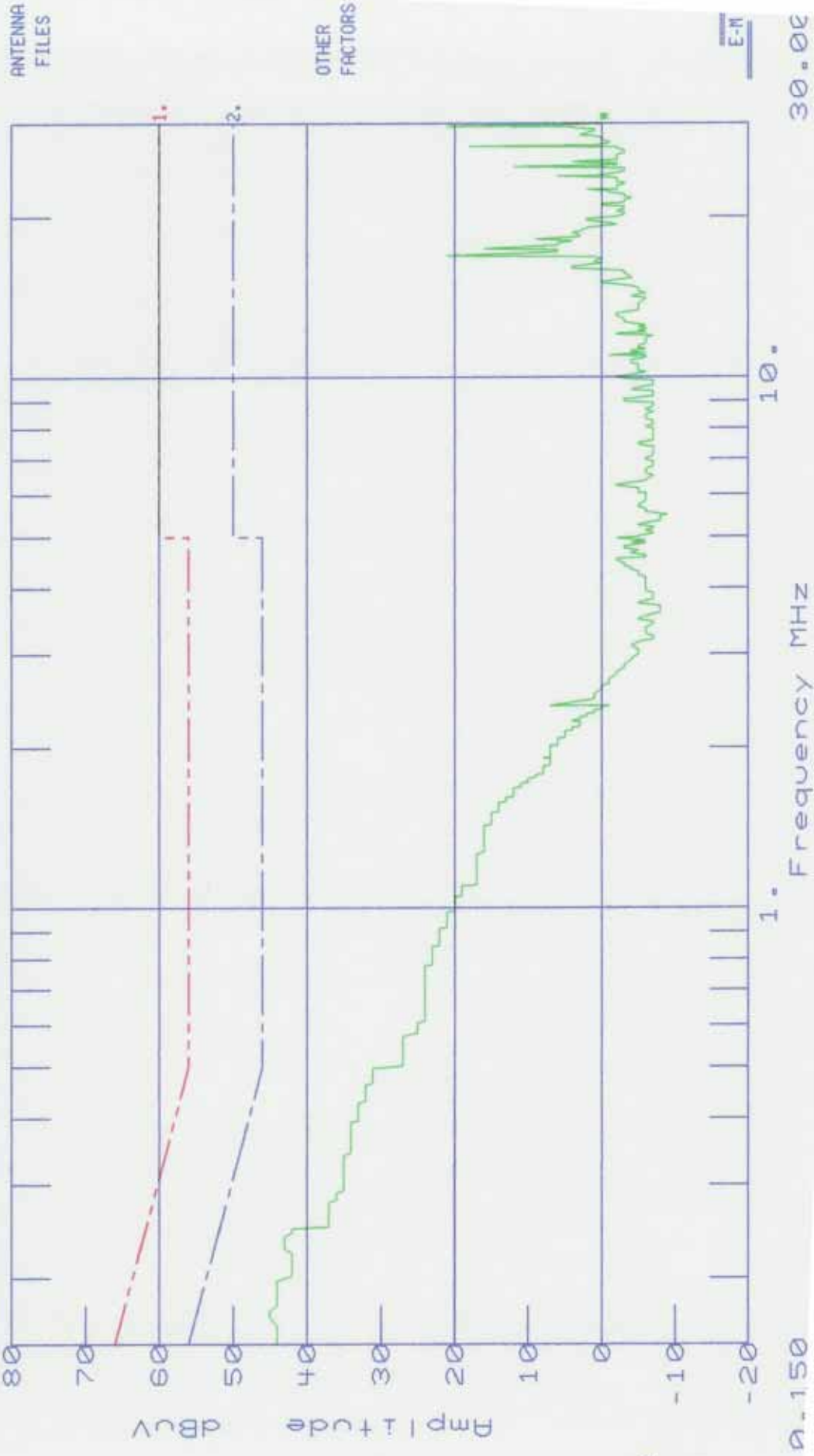
XM RADIO

Date : 08/23/04  
 Technician : CHIP FOERSTNER  
 Test Method : EN55022 CLASS B  
 Equipment : SA10101  
 Mode of Op. : TX @ 88.7 MHZ  
 Serial No. : 50KRS0CH  
 Time : 16:20:04.05  
 Test Equip. : EMC-30  
 Test Number : 1  
 Sensor Loc. : NEUTRAL  
 Sensor Pol. :  
 Ext. Atten. : 0 dB

Comment : POWER SUPPLY CUI MODEL 41-6-1000D 120VAC/60HZ

EMC-30 SETTINGS  
 Detector QuasiPeak  
 Bandwidth CISPR  
 Dump/Dwell IN/A  
 RF Atten. 10 dB  
 IF Atten. 10 dB

SPECS  
 1) CISPR 22 Quasi Peak  
 2) CISPR 22 AVG  
 3)  
 4)



A73

|                         |            |
|-------------------------|------------|
| TEST TITLE:XM RADIO     | PAGE 1     |
| DATA FILE :XMRADION.D30 | Freq.(MHz) |
| Amplitude Units : dBuV  | 0.1500     |
| Threshold -13 dB        |            |

| Freq(MHz) | Amp  | C22BQP.S30<br>vs Spec(dB) | C22BAVG.S30<br>vs Spec(dB) |
|-----------|------|---------------------------|----------------------------|
| 0.1500    | 43.0 |                           | -13.000 *                  |
| 0.1542    | 43.0 |                           | -12.771 *                  |
| 0.1583    | 43.0 |                           | -12.553 *                  |
| 0.1625    | 43.0 |                           | -12.335 *                  |
| 0.1689    | 44.0 |                           | -11.014 *                  |
| 0.1730    | 44.0 |                           | -10.815 *                  |
| 0.1770    | 43.0 |                           | -11.625 *                  |
| 0.1812    | 43.0 |                           | -11.430 *                  |
| 0.1854    | 43.0 |                           | -11.240 *                  |
| 0.1892    | 43.0 |                           | -11.072 *                  |
| 0.1933    | 43.0 |                           | -10.894 *                  |
| 0.1975    | 43.0 |                           | -10.715 *                  |
| 0.2021    | 41.0 |                           | -12.524 *                  |
| 0.2062    | 41.0 |                           | -12.357 *                  |
| 0.2104    | 41.0 |                           | -12.190 *                  |
| 0.2145    | 41.0 |                           | -12.029 *                  |
| 0.2187    | 41.0 |                           | -11.868 *                  |
| 0.2228    | 41.0 |                           | -11.714 *                  |
| 0.2274    | 42.0 |                           | -10.544 *                  |
| 0.2316    | 42.0 |                           | -10.392 *                  |
| 0.2357    | 42.0 |                           | -10.246 *                  |
| 0.2395    | 42.0 |                           | -10.114 *                  |
| 0.2437    | 40.0 |                           | -11.969 *                  |
| 0.2478    | 40.0 |                           | -11.831 *                  |

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# **APPENDIX**

## **B**

### **System Under Test Description**

## SYSTEM COMPONENTS

\*\*\*\*\*

DEVICE TYPE: EUT, XM RADIO SKY FI 2  
S/N: 50KR50CW

\*\*\*\*\*

DEVICE TYPE: EUT, SKY FI 2 MOBILE DOCK

\*\*\*\*\*

DEVICE TYPE: EUT, SKY FI 2 HOME DOCK

\*\*\*\*\*

DEVICE TYPE: EUT, SKY FI 2 AC POWER SUPPLY, DELPHI 41-6-1000D

\*\*\*\*\*

DEVICE TYPE: EUT, SKY FI MOBILE ANTENNA

\*\*\*\*\*

DEVICE TYPE: EUT, SKY FI HOME ANTENNA

\*\*\*\*\*

DEVICE TYPE: SPEAKERS

\*\*\*\*\*

## INTERFACE CABLES

\*\*\*\*\*

DEVICE TYPE: SPEAKERS

SHIELD: NO

LENGTH: 1 METER

CONNECTOR TYPE: DEDICATED TO MINI PLUG

PORT: LINE OUT ON SKY FI 2

\*\*\*\*\*

DEVICE TYPE: ANTENNA (EITHER)

SHIELD: COAX

LENGTH: 7 METERS

CONNECTOR TYPE: DEDICATED TO COAXIAL PLUG

PORT: ANTENNA IN ON SKY FI 2

\*\*\*\*\*

## AC LINE CORDS

\*\*\*\*\*

DEVICE TYPE: EUT

SHIELD: NO

LENGTH: 1 METER

CONNECTOR TYPE: DEDICATED TO COAXIAL PLUG

\*\*\*\*\*

# **APPENDIX**

## **C**

### **Measurement Protocol**

The test methodology followed during the collection of the data included within this technical report was ANSI C63.4:1992.

The EUT was powered with (120) VAC / (60) Hz during the collection of data included within.

The data is compared to the FCC Part 15 Class B limits.

The "EMI" instrumentation is capable of calculating the final emission level based on the following formula:

Level at the receiver (dB $\mu$ V) + Antenna Correction Factor (dB/M) + Cable Loss (dB) - Preamp Gain (dB) = Actual Level in dB $\mu$ V/M.

The sample calculation below is based on the actual test data collected:

|                |   |                    |              |            |
|----------------|---|--------------------|--------------|------------|
| Observed Level |   | <b>62.8</b>        | dB $\mu$ V   |            |
| ACF            | + | <b>9.2</b>         | dB/M         |            |
| Cable Loss     | + | <b>1.1</b>         | dB           |            |
| Preamp Gain    | - | <b><u>26.0</u></b> | dB           |            |
| Actual Level   |   | <b>47.1</b>        | dB $\mu$ V/M | @ 88.7 MHz |

**Please have a company official review this report and sign.**

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