



**FCC CFR47 PART 18 SUBPART C  
ISM EQUIPMENT**

**TEST REPORT**

**FOR**

**MICROWAVE OVEN**

**MODEL NUMBER: OTR4**

**MAGNETRON MODEL: 2M167B and 2M253J(L)**

**FCC ID: APYDMR0162**

**REPORT NUMBER: 05U3348-1**

**ISSUE DATE: MAY 4, 2005**

*Prepared for*  
**SHARP CORPORATION  
22-22 NAGAIKE-CHO,  
ABENO-KU RELIABILITY CONTROL GROUP  
OSAKA, JAPAN, 545-8522**

*Prepared by*  
**COMPLIANCE CERTIFICATION SERVICES  
561F MONTEREY ROAD,  
MORGAN HILL, CA 95037, USA  
TEL: (408) 463-0885  
FAX: (408) 463-0888**



**LAB CODE:200065-0**

Revision History

| Rev. |  | Revisions |  | Revised By |
|------|--|-----------|--|------------|
|      |  |           |  |            |
|      |  |           |  |            |
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|      |  |           |  |            |

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## 1 ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SHARP ELECTRONIC CORP  
22-22 NAGAIKE-CHO,  
ABENO-KU RELIABILITY CONTROL GROUP  
OSAKA, JAPAN, 545-8522

**EUT DESCRIPTION:** MICROWAVE OVEN

**MODEL NUMBER:** OTR4

**SERIAL NUMBER:** 128719, 128720

**MAGNETRON MODELS:** 2M167B, 2M253J(L)

**DATE TESTED:** APRIL 16 - 18, 2005

| APPLICABLE STANDARDS                                                                                          |                         |
|---------------------------------------------------------------------------------------------------------------|-------------------------|
| STANDARD                                                                                                      | TEST RESULTS            |
| FCC PART 18 SUBPART C                                                                                         | NO NON-COMPLIANCE NOTED |
| &                                                                                                             |                         |
| FCC METHEROD OF MEASUREMENTS OF<br>RADIO NOISE EMISSION FROM INDUSTRIAL,<br>SCIENTIFIC, AND MEDICAL EQUIPMENT |                         |
| FCC / OST MP-5                                                                                                |                         |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



YAN ZHENG  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



HITESH H. SOLANKI  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## **2 PRODUCT DESCRIPTION**

The equipment under test is a microwave oven sold for consumer use. Model: OTR4 is an 850W microwave oven with digital controls panel.

Magnetron Model: 2M167B AND 2M253J(L)

## **3 TEST FACILITY**

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## **4 ACCREDITATION AND LISTING**

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

## 5 MEASUREMENT EQUIPMENT LIST

| TEST EQUIPMENT LIST                  |                           |                  |            |            |
|--------------------------------------|---------------------------|------------------|------------|------------|
| Name of Equipment                    | Manufacturer              | Model No.        | Serial No. | Due Date   |
| Quasi-Peak Adaptor                   | HP                        | 85650A           | 2811A01155 | 5/24/2005  |
| SA Display Section 2                 | HP                        | 85662A           | 2816A16696 | 5/24/2005  |
| Site A Preamplifier, 1300MHz         | HP                        | 8447D            | 2944A06833 | 8/17/2005  |
| SA RF Section, 1.5 GHz               | HP                        | 85680B           | 2814A04227 | 5/24/2005  |
| 30MHz---- 2Ghz                       | Sunol Sciences            | JB1 Antenna      | A121003    | 9/12/2005  |
| Spectrum Analyzer                    | HP                        | E4446A           | US42510266 | 8/25/2005  |
| EMI Test Receiver                    | R & S                     | ESHS 20          | 827129/006 | 10/22/2005 |
| Site A Line Stabilizer / Conditioner | Tripplite                 | LC-1800a         | A0051681   | CNR        |
| LISN, 10 kHz ~ 30 MHz                | FCC                       | LISN-50/250-25-2 | 2023       | 8/30/2005  |
| Digital Power Analyzer               | Valhalla                  | 2111A            | NA         | 4/20/2005  |
| Ajustable Power Supply               | The Superior Electric Co. | Powerstat        | NA         | CNR        |
| Microwave Leakage Tester             | Simpson                   | 380-2            | 6-115310   | 9/28/2005  |

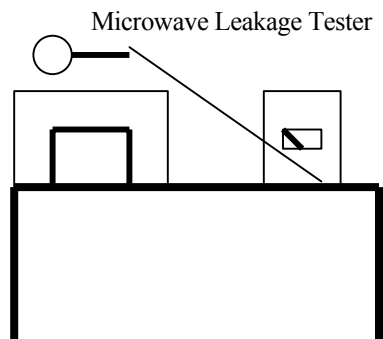
## 6 LIMITS AND RESULTS

### 6.1 RADIATION HAZARD MEASUREMENT

Limits:

FCC METHOD OF MEASUREMENTS OF RADIO NOISE EMISSION FROM INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT, FCC / OST MP-5, SECTION 3.1

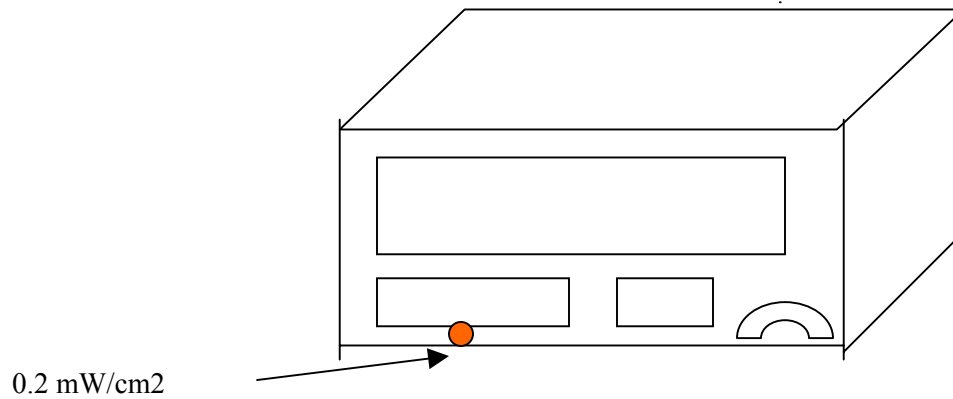
Test Procedure:



A 700-ml water load was placed in the center of the oven. The power setting was set to 10 (100%) maximum power. While the oven was operating, the STE probe was moved slowly around the door seams to check for leakage.

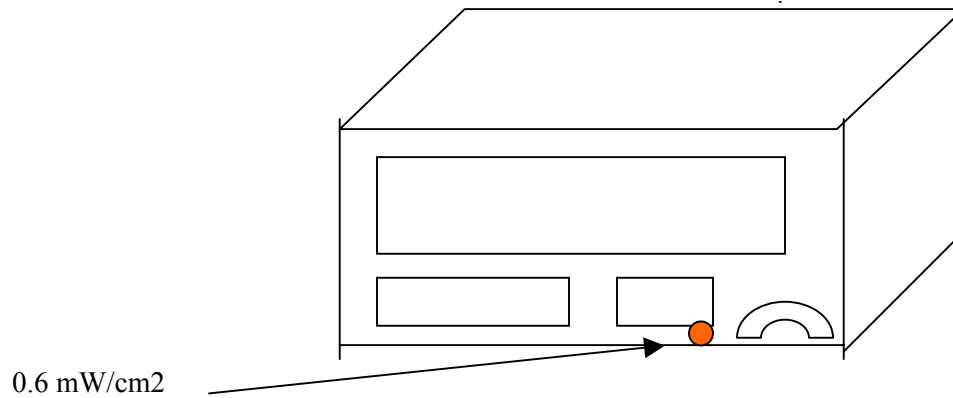
Test Result:

**MAGNETRON: 2M167B**



|                                                           | Maximum Leakage<br>(mW/cm2) | Limit<br>(mW/cm2) |
|-----------------------------------------------------------|-----------------------------|-------------------|
| Figure shown above for the<br>location of maximum leakage | 0.2                         | 1.00              |
| All Others                                                | 0.05                        | 1.00              |

**MAGNETRON: 2M253J(L)**



|                                                           | Maximum Leakage<br>(mW/cm2) | Limit<br>(mW/cm2) |
|-----------------------------------------------------------|-----------------------------|-------------------|
| Figure shown above for the<br>location of maximum leakage | 0.6                         | 1.00              |
| All Others                                                | 0.1                         | 1.00              |

## 6.2 INPUT POWER

### Limit

FCC METHOD OF MEASUREMENTS OF RADIO NOISE EMISSION FROM INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT, FCC / OST MP-5. SECTION 4.3

### Test Procedure

Input power and current were measured using a wattmeter and an amp-meter. A 700 ml water load was placed in the center of the oven and the oven was set to 10 (100%) maximum power. A 700-ml water load was chosen for its compatibility. Manufacturers to determine their input ratings commonly use this procedure.

### Test Result:

#### **MAGNETRON 2M167B**

| Input Voltage<br>(Vac) | Input Current<br>(Amps) | Measured Input<br>Power (Watts) |
|------------------------|-------------------------|---------------------------------|
| 115                    | 12.85                   | 1482                            |

#### **MAGNETRON 2M253J(L)**

| Input Voltage<br>(Vac) | Input Current<br>(Amps) | Measured Input<br>Power (Watts) |
|------------------------|-------------------------|---------------------------------|
| 115                    | 13.85                   | 1471                            |

## 6.3 RF OUTPUT POWER MEASUREMENT

### Limit

FCC METHOD OF MEASUREMENTS OF RADIO NOISE EMISSION FROM INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT, FCC / OST MP-5. SECTION 4.3

### Test Procedure

The Caloric Method was used to determine maximum output power. The initial temperature of a 1000-ml water load was measured.

The water load was placed in the center of the oven. The oven was operated at maximum output power for 120 seconds. Then the temperature of the water was re-measured.

### Test Result:

#### **MAGNETRON 2M167B**

| Start Temp<br>(°C) | Final Temp<br>(°C) | Elapsed Time<br>(120 sec) | RF Power<br>(Watts) |
|--------------------|--------------------|---------------------------|---------------------|
| 20.9               | 39.6               | 120                       | 654.50              |
| 19.2               | 36                 | 120                       | 588.00              |
| 20.9               | 35.8               | 120                       | 521.50              |

Average of 3 Trials : 588.00 W

#### **MAGNETRON 2M253J(L)**

| Start Temp<br>(°C) | Final Temp<br>(°C) | Elapsed Time<br>(120 sec) | RF Power<br>(Watts) |
|--------------------|--------------------|---------------------------|---------------------|
| 19.7               | 36.2               | 120                       | 577.50              |
| 20.00              | 33.00              | 120                       | 455.00              |
| 19.8               | 32.2               | 120                       | 434.00              |

Average of 3 Trials : 488.83 W

Power = (4.2 Joules/Cal) x (Volume in ml) x (Temp. Rise) / (Time in seconds)

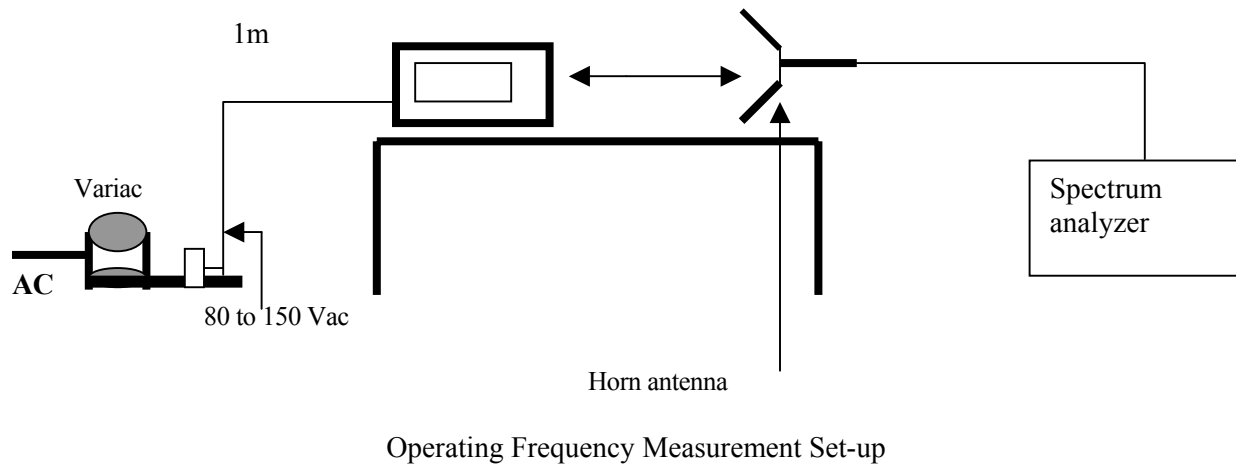
The measured output was found to be OVER 500Watts. Therefore, in accordance with section 18.305 of Subpart B, the measured out-of-band emissions were compared to the  $25 \sqrt{\text{Power}/500}$  @ 300m limit.

## 6.4 OPERATING FREQUENCY MEASUREMENTS

### Limit

FCC PART 18 SUBPART C, § 18.301

### Test Procedure



### Test Result:

#### 6.4.1 VARIATION IN OPERATING FREQUENCY WITH TIME

The operating frequency was measured using a spectrum analyzer. Starting with the EUT at room temperature, a 1000-ml water load was placed in the center of the oven and the oven was operated at maximum output power.

The fundamental operating frequency was monitor until the water load was reduced to 20% of the original load.

The results of this test are as follows.

Initial load: 1000 ml

Load at completion of test: 200 ml

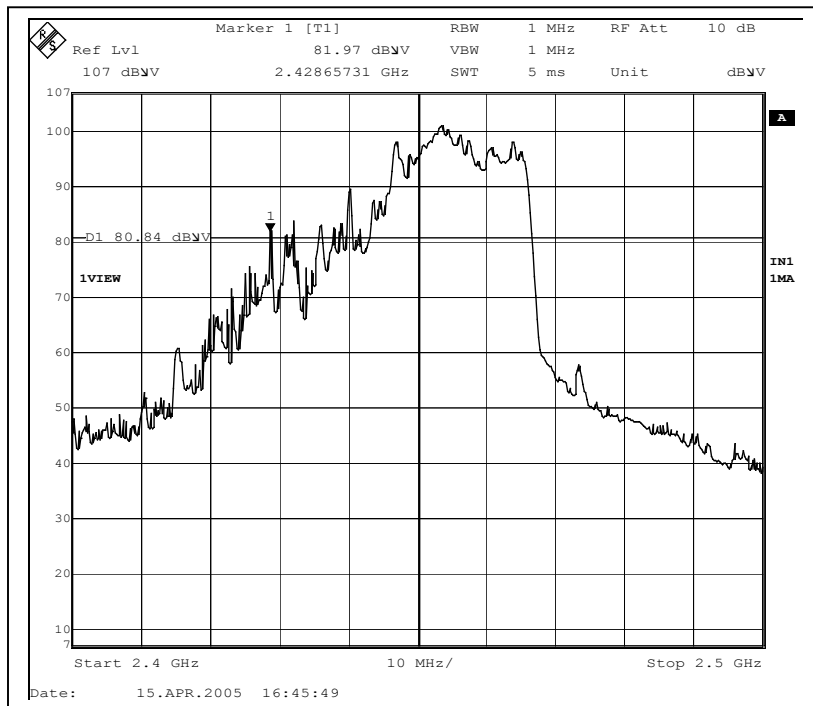
##### **MAGNETRON 2M167B**

|                                         | <b>Freq.<br/>(MHz)</b> |
|-----------------------------------------|------------------------|
| <b>Minimum Frequency<br/>(2400 MHz)</b> | <b>2428.65</b>         |
| <b>Maximum Frequency<br/>(2500 MHz)</b> | <b>2466.73</b>         |

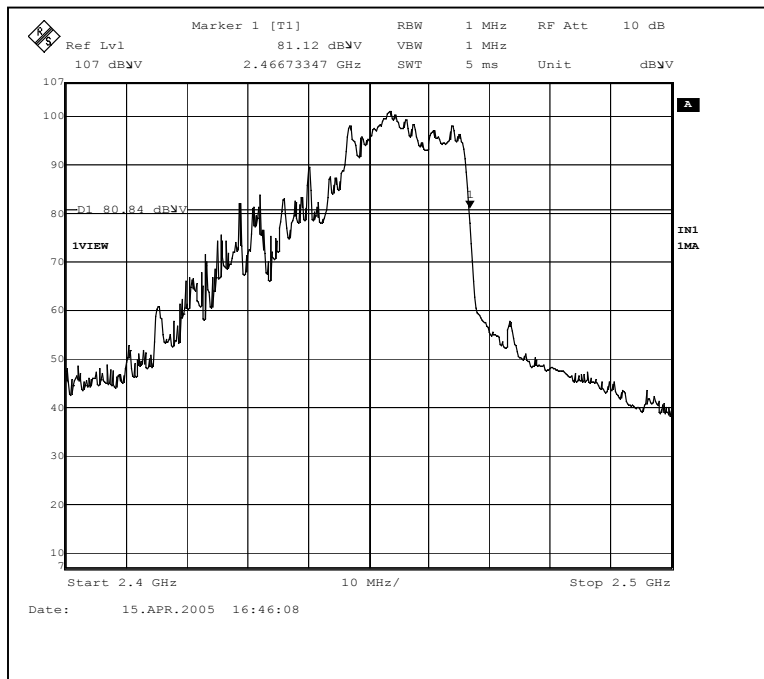
##### **MAGNETRON 2M253J(L)**

|                                         | <b>Freq.<br/>(MHz)</b> |
|-----------------------------------------|------------------------|
| <b>Minimum Frequency<br/>(2400 MHz)</b> | <b>2427.05</b>         |
| <b>Maximum Frequency<br/>(2500 MHz)</b> | <b>2462.92</b>         |

**MAGNETRON 2M167B**

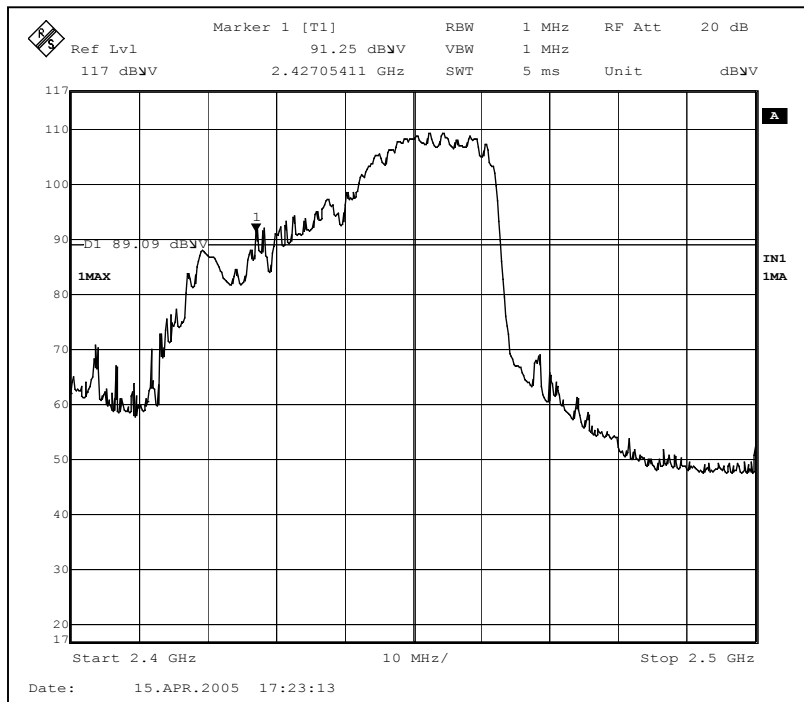


**Minimum Frequency @ 115Vac**

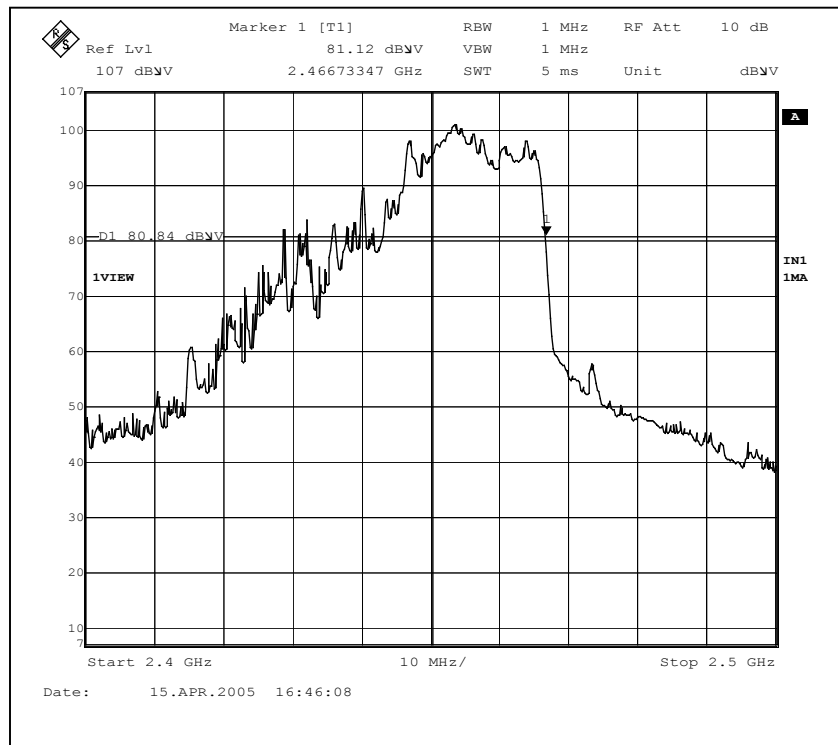


**Maximum Frequency @ 115Vac**

**MAGNETRON 2M253J(L)**



**Minimum Frequency @ 115Vac**



**Maximum Frequency @ 115Vac**

## 6.4.2 VARIATION IN OPERATING FREQUENCY WITH VOLTAGE

Following the above test, after operating the oven long enough to assure that stable operating temperature were obtained, the operating frequency was monitored as the input voltage was varied between 80 to 125 percent of the nominal rating.

The water load was maintained at 200 ml for the duration of the test.

The results of this test are as follows:

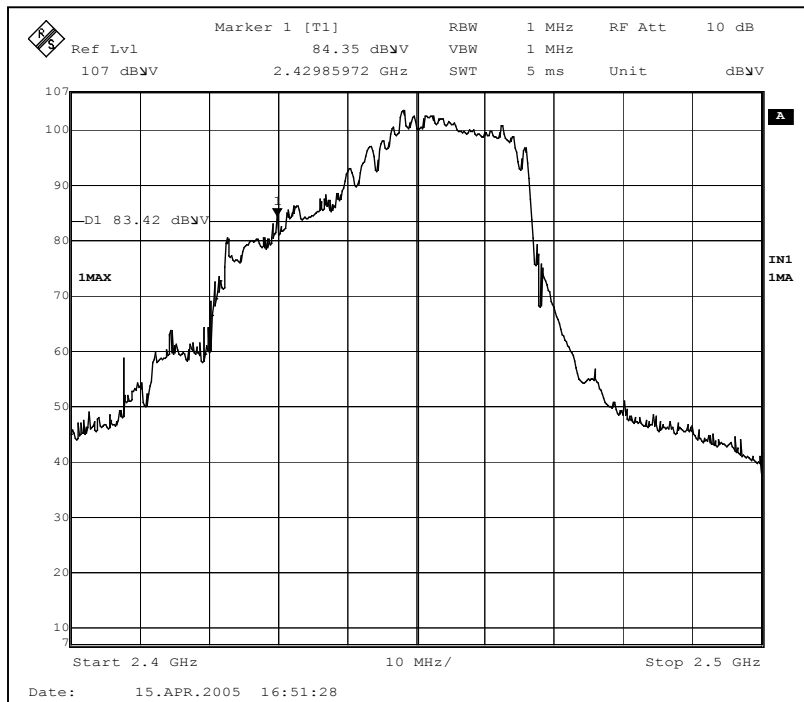
### **MAGNETRON 2M167B**

|                                         | <b>96Vac<br/>(MHz)</b> | <b>115Vac<br/>(MHz)</b> | <b>150Vac<br/>(MHz)</b> |
|-----------------------------------------|------------------------|-------------------------|-------------------------|
| <b>Minimum Frequency<br/>(2400 MHz)</b> | <b>2429.85</b>         | <b>2428.65</b>          | <b>2431.06</b>          |
| <b>Maximum Frequency<br/>(2500 MHz)</b> | <b>2466.93</b>         | <b>2466.73</b>          | <b>2466.73</b>          |

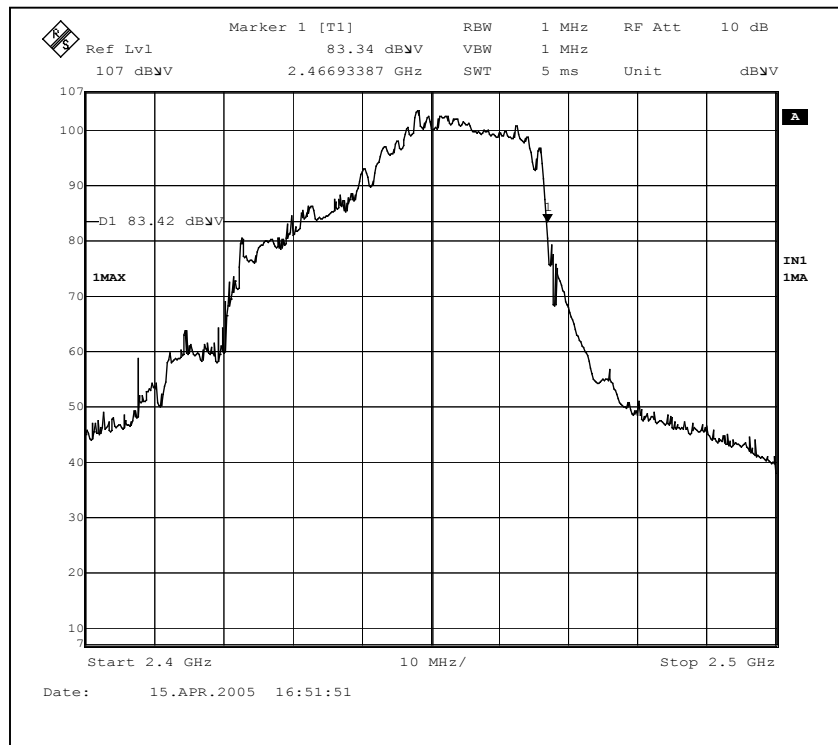
### **MAGNETRON 2M253J(L)**

|                                         | <b>96Vac<br/>(MHz)</b> | <b>115Vac<br/>(MHz)</b> | <b>150Vac<br/>(MHz)</b> |
|-----------------------------------------|------------------------|-------------------------|-------------------------|
| <b>Minimum Frequency<br/>(2400 MHz)</b> | <b>2427.25</b>         | <b>2427.05</b>          | <b>2428.25</b>          |
| <b>Maximum Frequency<br/>(2500 MHz)</b> | <b>2461.25</b>         | <b>2462.92</b>          | <b>2463.52</b>          |

**MAGNETRON 2M167B**

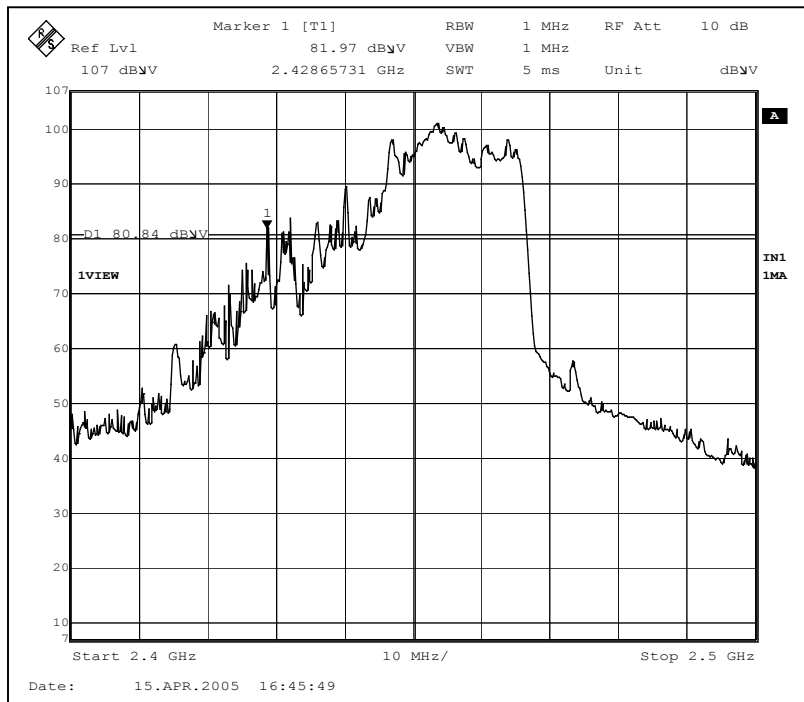


**Minimum Frequency @ 96 Vac**

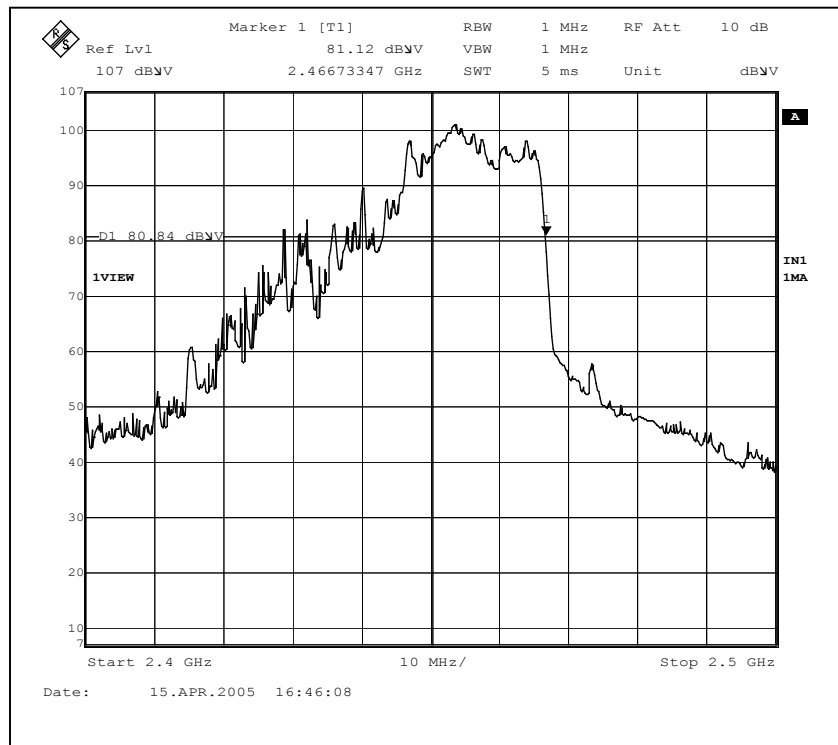


**Maximum Frequency @ 96 Vac**

**MAGNETRON 2M167B**

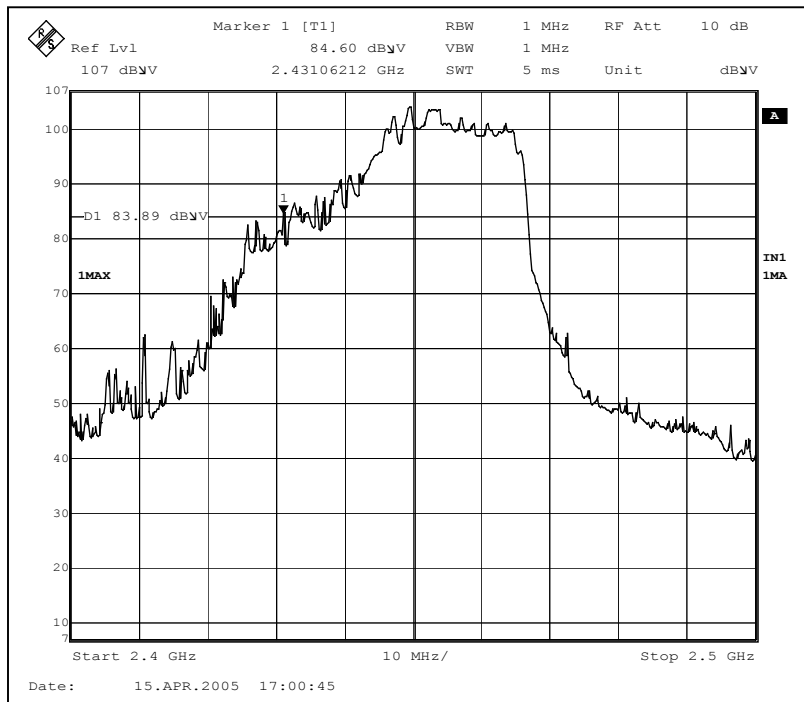


**Minimum Frequency @ 115Vac**

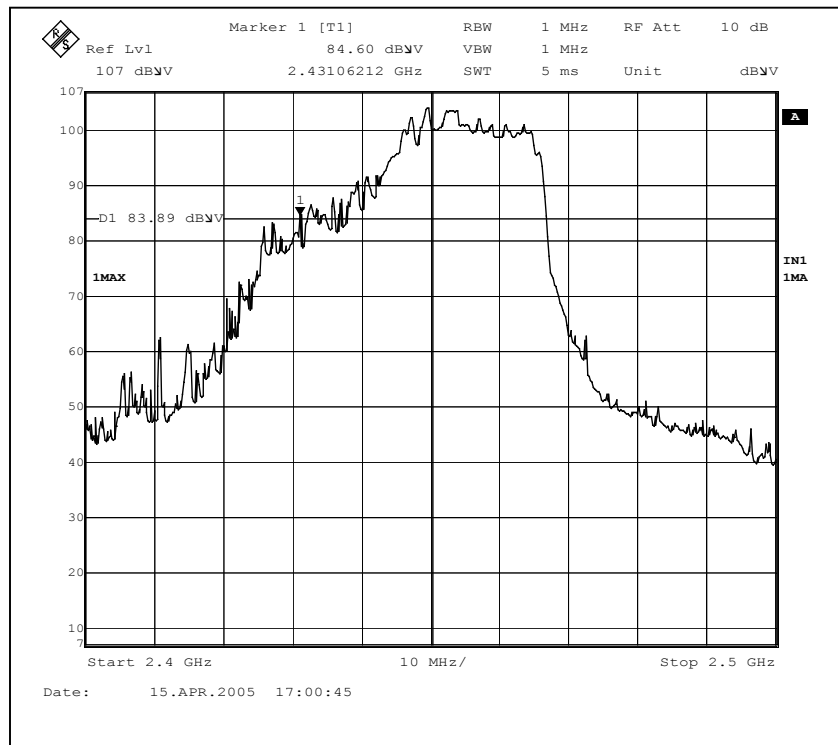


**Maximum Frequency @ 115Vac**

**MAGNETRON 2M167B**

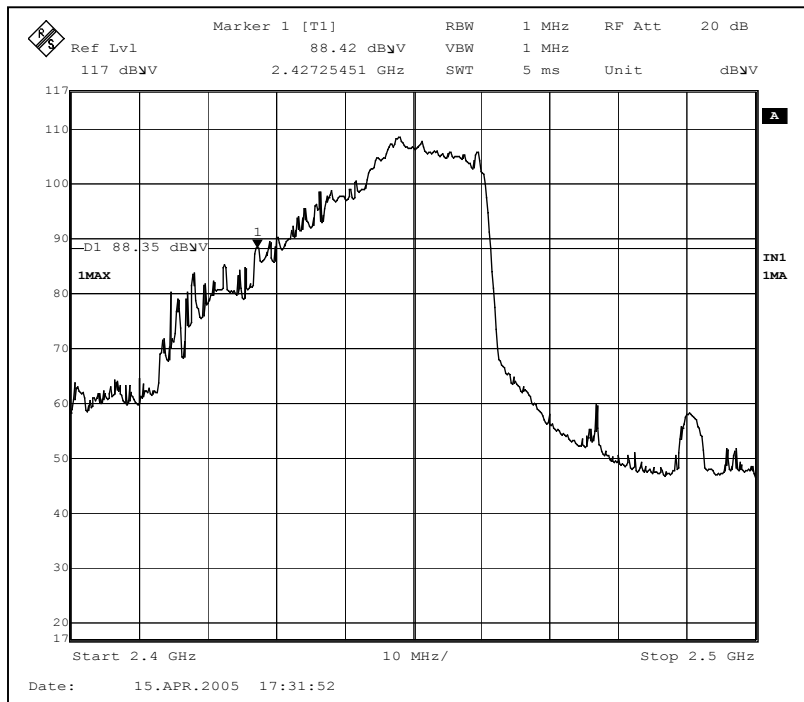


**Minimum Frequency @ 150 Vac**

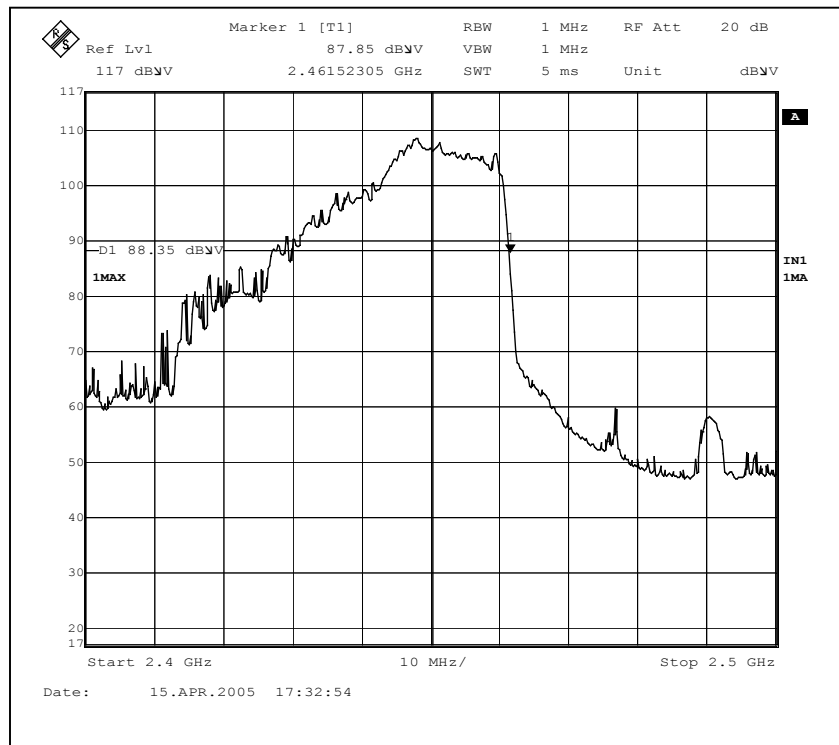


**Maximum Frequency @ 150 Vac**

**MAGNETRON 2M253J(L)**

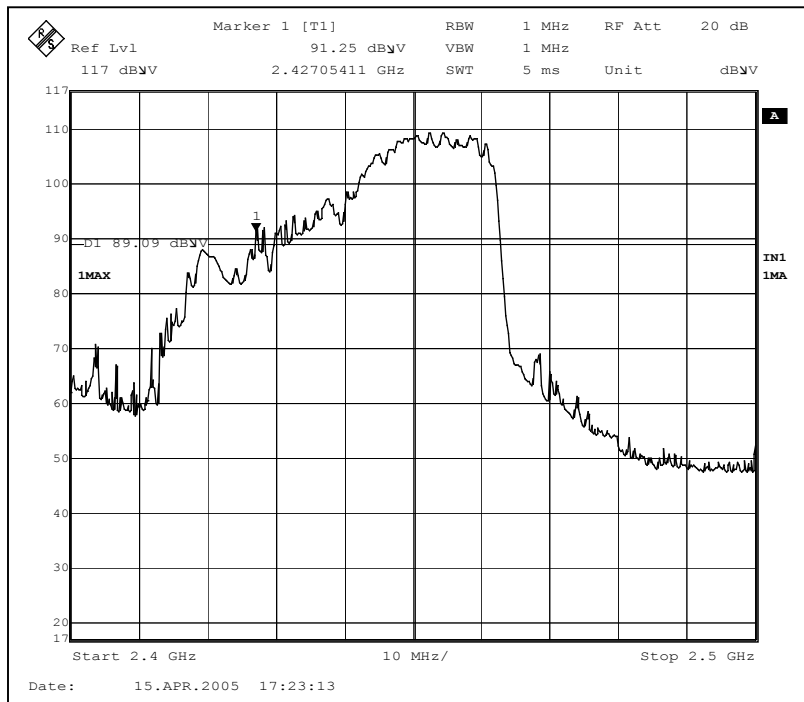


**Minimum Frequency @ 96 Vac**

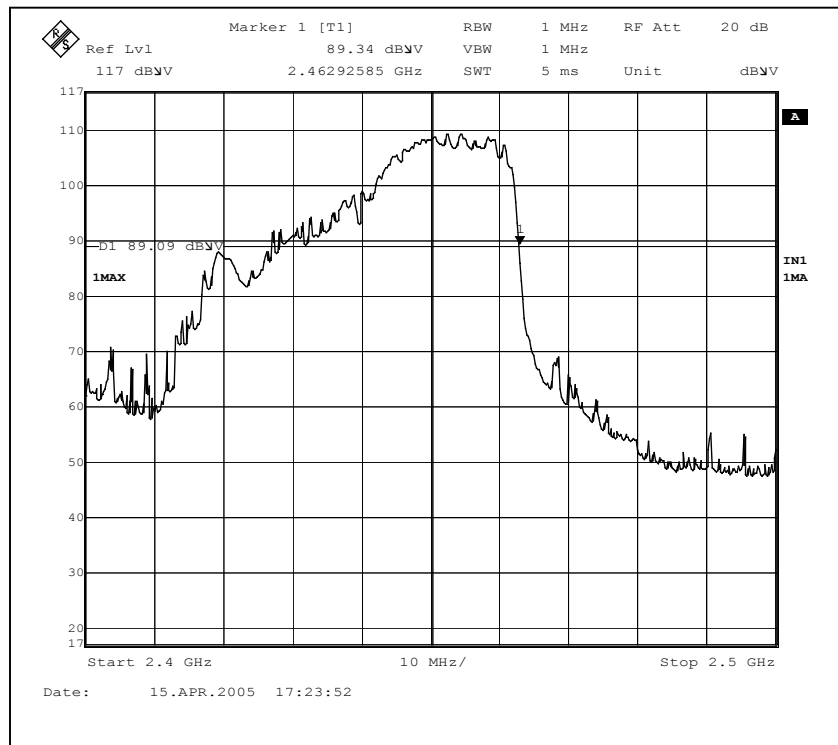


**Maximum Frequency @ 96 Vac**

**MAGNETRON 2M253J(L)**

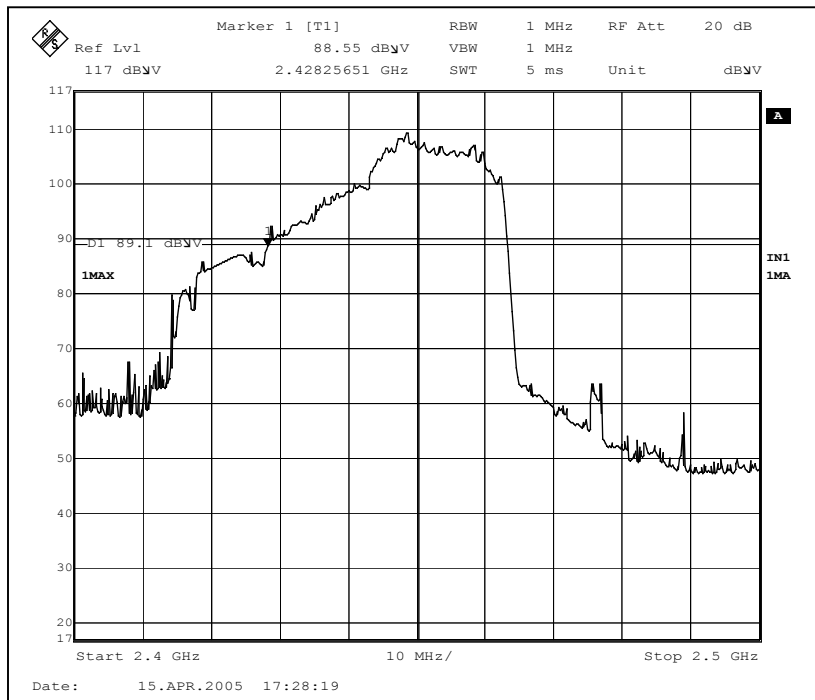


**Minimum Frequency @ 115Vac**

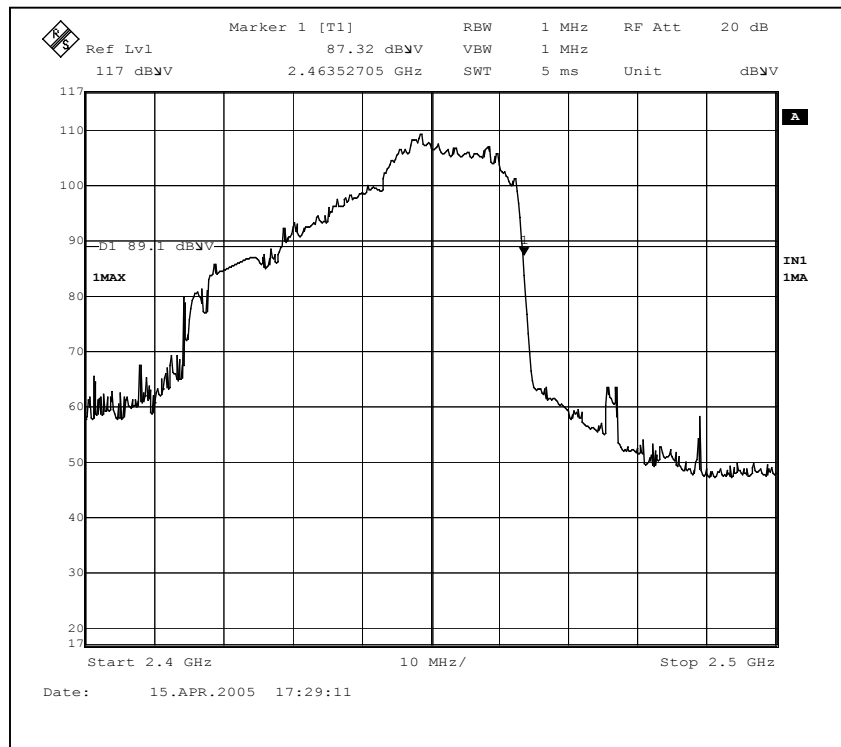


**Maximum Frequency @ 115Vac**

**MAGNETRON 2M253J(L)**



**Minimum Frequency @ 150 Vac**



**Maximum Frequency @ 150 Vac**

## 6.5 RADIATED EMISSIONS

### Limit

FCC PART 18 SUBPART C, § 18.305

### Test Procedure

Radiated emissions were measured over an inclusive frequency range to 100MHz through the tenth harmonic of the operating frequency. For this test, an 80cm high wooden table in an open laboratory area supported the device under test. The table was placed on a turntable.

The measurement antenna was placed 3 meters for measurements from 30 - 1000MHz and 1 meter for measurements from 1000 - 14,000MHz, respectively, for the device under test. The indicated frequency range was swept as the device under test was rotated along its vertical axis in 90° increments.

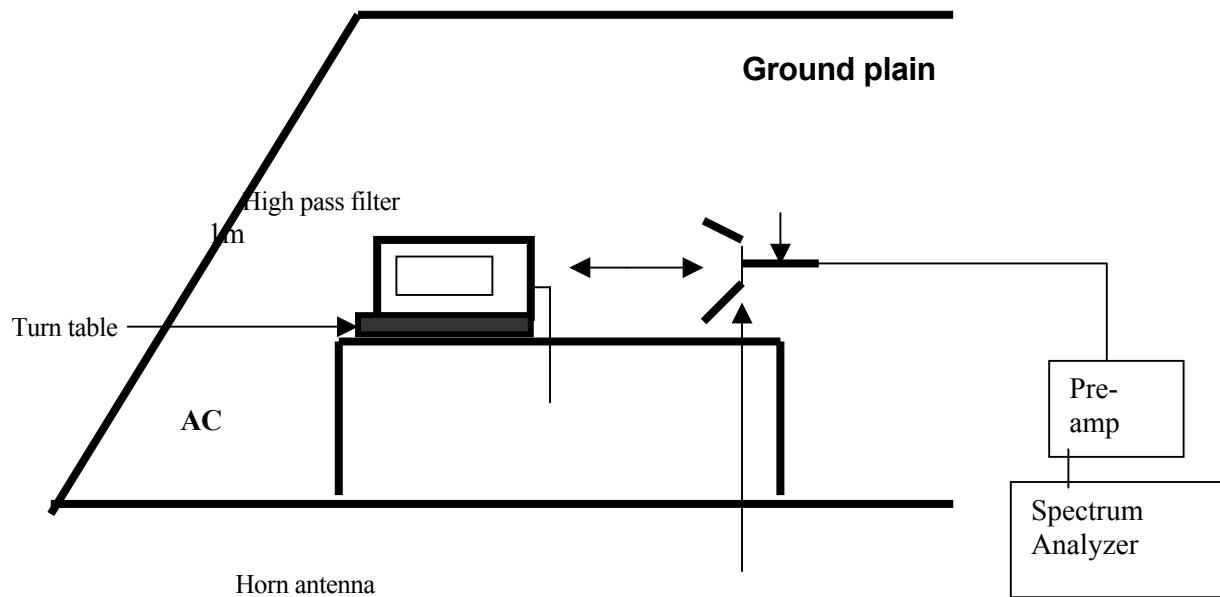
During the preliminary tests, the load consisted of 700-ml tap water placed in the center of the oven. The emissions were observed while the device under test was operated at maximum output power.

The level of the emissions near the edge of the designated ISM frequency band was measured. For this test, the load consisted of 700-ml water load located in the center of the oven.

The levels of the second and third harmonic were measured inclusively with a 300 ml and 700 ml water load alternately placed in the center and right front corner of the oven. Harmonics beyond the third were measured with a 700-ml load placed in the center of the oven. The data obtained during these tests is contained on the attached spreadsheet.

The maximum of all other out-of-band emissions were measured while a 700-ml load was placed in the center of the oven. Maximum readings were recorded after variations in antenna polarizations, height, device orientation, load position, and size. For frequencies above 1 GHz, the video bandwidth of the spectrum analyzer was set to simulate a linear average detection mode (10Hz).

For all emissions the equivalent 300 meters intensity was calculated assuming a linear decrease in the intensity of the RFI field with increased distance. In the operating modes and conditions described, there were no over-limit emissions discovered.



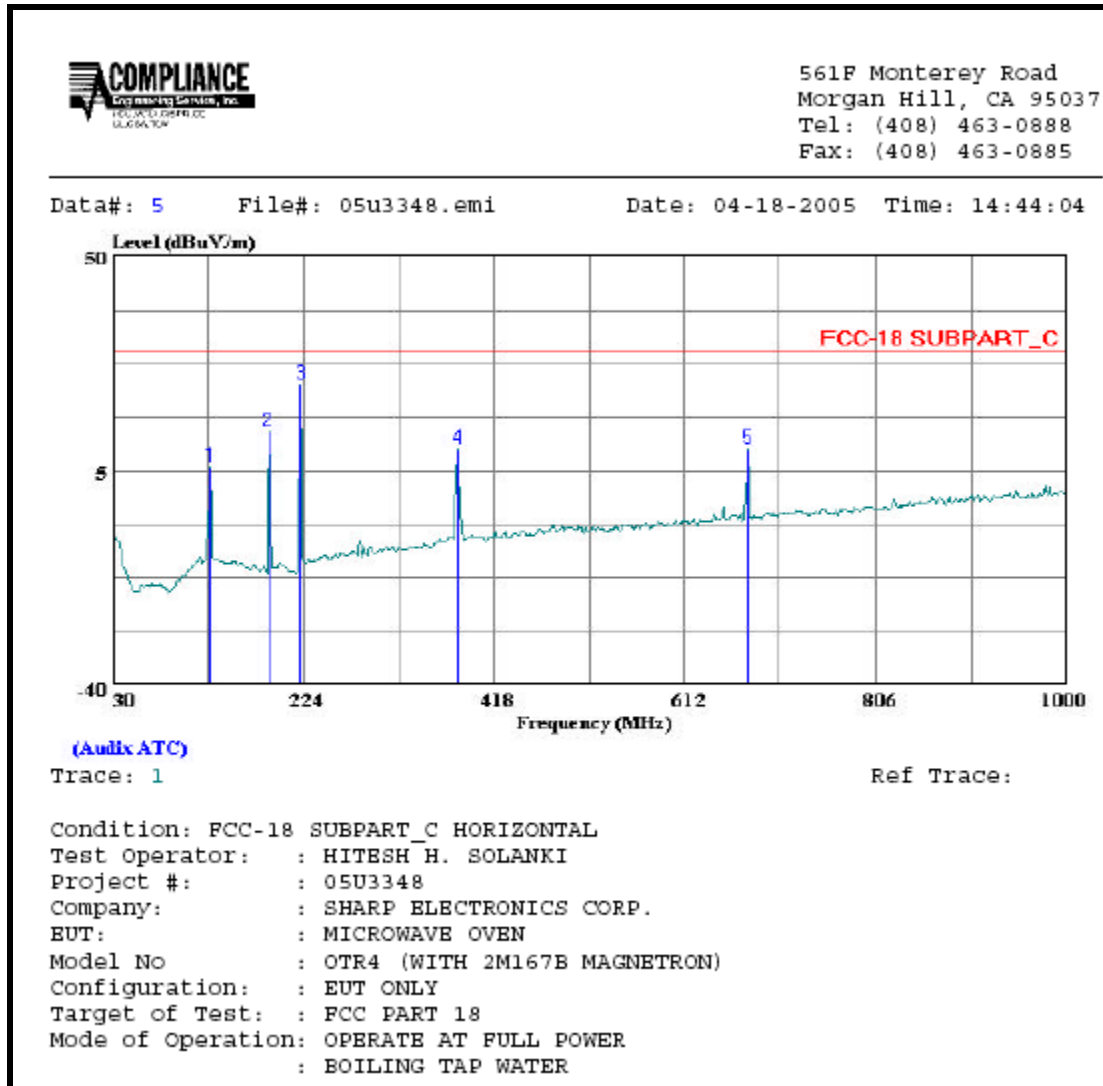
Radiated Emissions Configuration

## 6.5.1 RADIATED EMISSIONS – BELOW 1GHz

An offset of 40.00 dB has been given for distance correction.

### MAGNETRON 2M167B

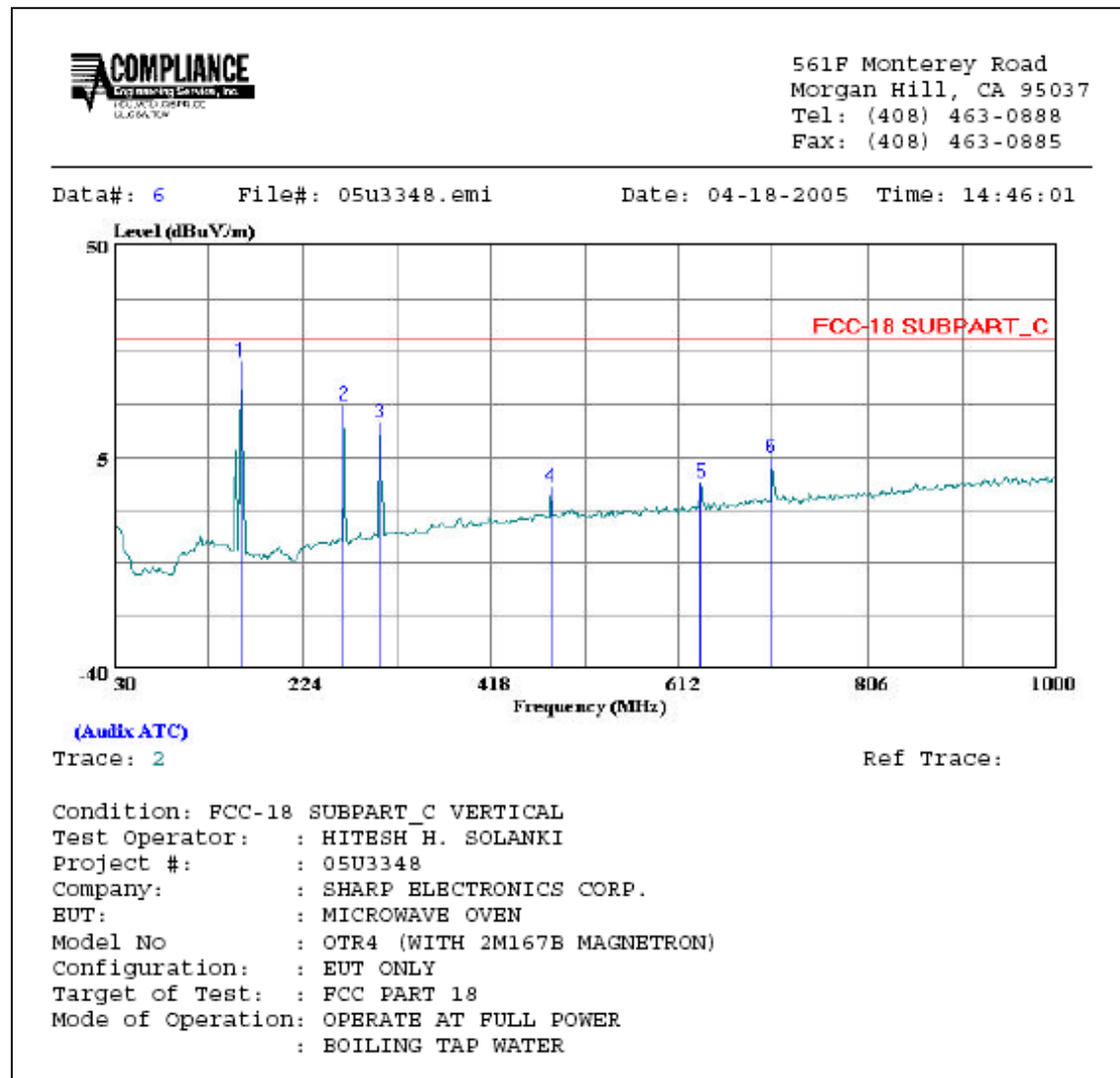
#### HORIZONTAL PLOT



HORIZONTAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 128.940 | -9.47         | 15.15  | 5.68   | 28.66         | -22.98        | Peak   |
| 2 | 189.080 | 0.19          | 12.93  | 13.12  | 28.66         | -15.54        | Peak   |
| 3 | 221.090 | 10.50         | 12.67  | 23.17  | 28.66         | -5.49         | Peak   |
| 4 | 381.140 | -8.19         | 17.62  | 9.43   | 28.66         | -19.23        | Peak   |
| 5 | 676.990 | -13.25        | 22.74  | 9.49   | 28.66         | -19.17        | Peak   |

VERTICAL PLOT

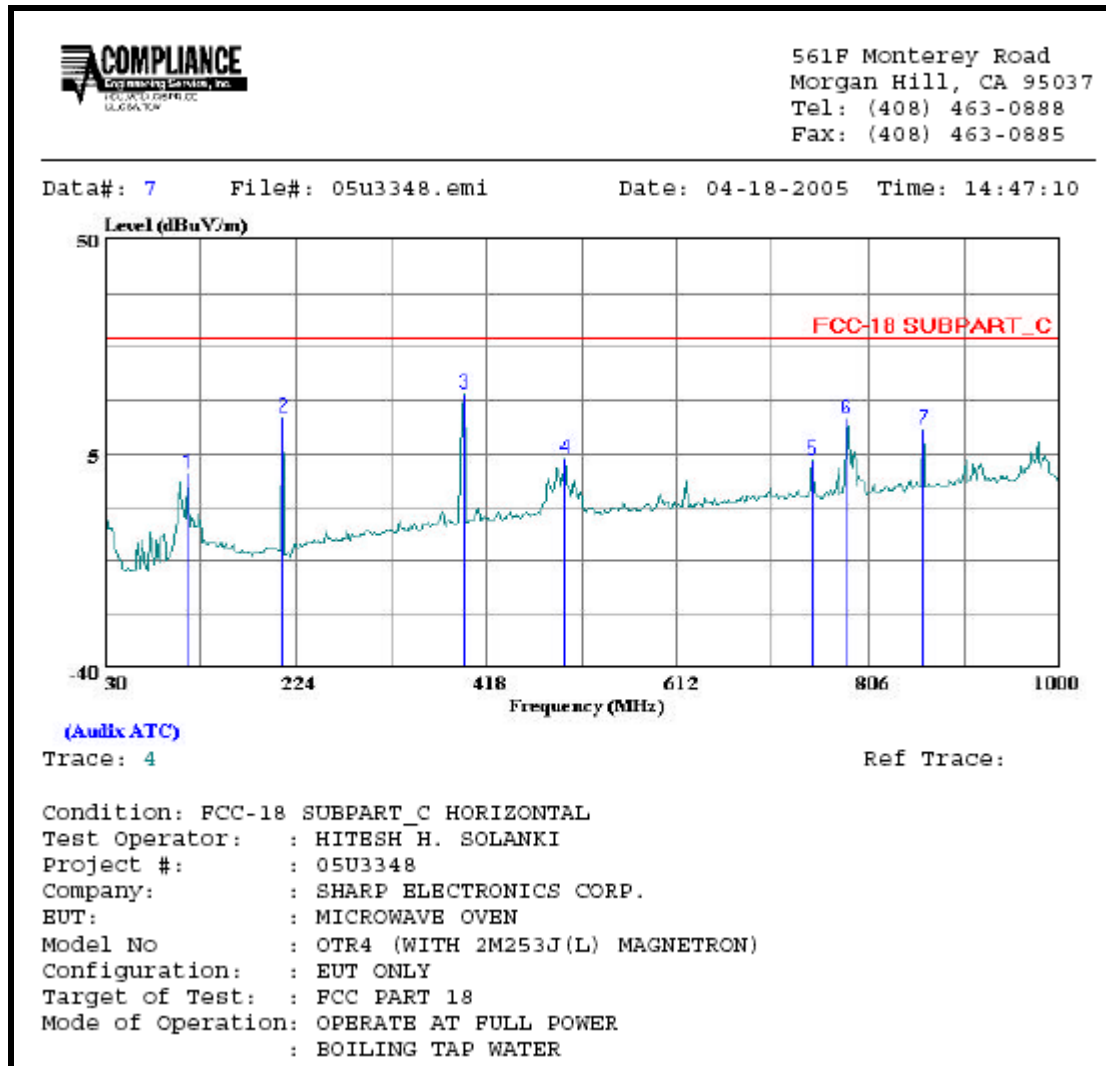


VERTICAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 159.980 | 11.47         | 13.81  | 25.28  | 28.66         | -3.38         | Peak   |
| 2 | 266.680 | 1.55          | 14.45  | 16.00  | 28.66         | -12.66        | Peak   |
| 3 | 303.540 | -3.45         | 15.75  | 12.30  | 28.66         | -16.36        | Peak   |
| 4 | 480.080 | -21.19        | 19.82  | -1.37  | 28.66         | -30.03        | Peak   |
| 5 | 635.280 | -22.40        | 22.08  | -0.32  | 28.66         | -28.98        | Peak   |
| 6 | 708.030 | -18.35        | 23.23  | 4.88   | 28.66         | -23.78        | Peak   |

## MAGNETRON 2M253J(L)

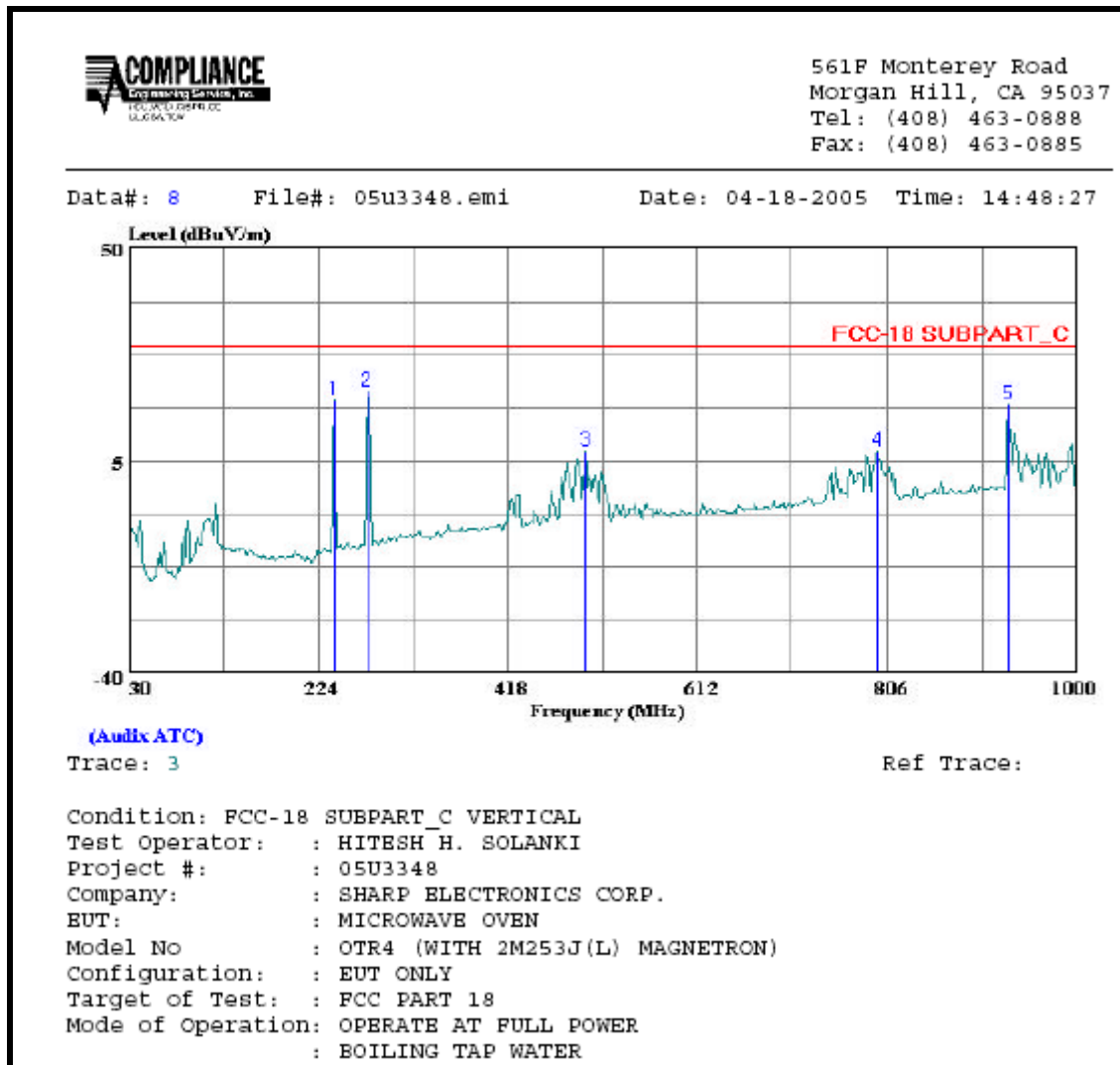
### HORIZONTAL PLOT



HORIZONTAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 114.390 | 0.86          | 0.00   | 0.86   | 27.86         | -27.00        | Peak   |
| 2 | 211.390 | 12.56         | 0.00   | 12.56  | 27.86         | -15.30        | Peak   |
| 3 | 395.690 | 17.59         | 0.00   | 17.59  | 27.86         | -10.27        | Peak   |
| 4 | 497.540 | 3.80          | 0.00   | 3.80   | 27.86         | -24.06        | Peak   |
| 5 | 749.740 | 3.65          | 0.00   | 3.65   | 27.86         | -24.21        | Peak   |
| 6 | 783.690 | 12.34         | 0.00   | 12.34  | 27.86         | -15.52        | Peak   |
| 7 | 861.290 | 10.27         | 0.00   | 10.27  | 27.86         | -17.59        | Peak   |

VERTICAL PLOT



VERTICAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 240.490 | 4.25          | 13.54  | 17.79  | 27.86         | -10.07        | Peak   |
| 2 | 274.440 | 4.99          | 14.76  | 19.75  | 27.86         | -8.11         | Peak   |
| 3 | 497.540 | -13.20        | 20.19  | 6.99   | 27.86         | -20.87        | Peak   |
| 4 | 795.330 | -17.50        | 24.48  | 6.98   | 27.86         | -20.88        | Peak   |
| 5 | 929.190 | -9.38         | 26.25  | 16.87  | 27.86         | -10.99        | Peak   |

## 6.5.2 RADIATED EMISSIONS – ABOVE 1GHz

### MAGNETRON 2M167B

3/25/2005 **High Frequency Measurement**  
Compliance Certification Services, Morgan Hill Open Field Site

**Test Engr:** HITESH H. SOLANKI  
**Project #:** 05U3348  
**Company:** SHARP ELECTRONICS CORP.  
**EUT Descrip.:** MICROWAVE OVEN  
**EUT M/N:** OTR4 (WITH 2M167B MAGNETRON)  
**Test Target:** FCC PART 18 SUBPART C  
**Mode Oper:** OPERATE AT FULL POWER, BOILING TAP WATER - 1000 mL

**Test Equipment:**

|                    |                       |                        |              |
|--------------------|-----------------------|------------------------|--------------|
| EMCO Horn 1-18GHz  | Pre-amplifier 1-26GHz | Pre-amplifier 26-40GHz | Horn > 18GHz |
| T60; S/N: 2238 @3m | T86 Miteq924341       |                        |              |

Hi Frequency Cables

|              |              |              |               |
|--------------|--------------|--------------|---------------|
| 2 foot cable | 3 foot cable | 4 foot cable | 12 foot cable |
|              | 3_Vien       |              | 12_Hitesh     |

HPF HPF\_4.0GHz

Reject Filter

**Peak Measurements**  
RBW=VBW=1MHz

**Average Measurements**  
RBW=1MHz ; VBW=10Hz

| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Filtr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) |
|-------|----------|--------------|----------------|---------|-------|--------|-----------|----------|-------------|------------|---------------|----------------|-----------|------------|-------------|
| 4.921 | 3.0      | 78.9         | 51.3           | 33.0    | 3.9   | -44.1  | -40.0     | 0.6      | 32.3        | 4.7        | 48.7          | 28.7           | -16.4     | -24.0      | V           |
| 7.369 | 3.0      | 75.1         | 43.2           | 36.0    | 5.3   | -44.7  | -40.0     | 0.6      | 32.3        | 0.4        | 48.7          | 28.7           | -16.3     | -28.2      | V           |
| 9.154 | 3.0      | 71.0         | 38.5           | 37.8    | 6.2   | -43.4  | -40.0     | 0.8      | 32.3        | -0.2       | 48.7          | 28.7           | -16.3     | -28.8      | V           |
| 4.921 | 3.0      | 79.9         | 49.8           | 33.0    | 3.9   | -44.1  | -40.0     | 0.6      | 33.3        | 3.2        | 48.7          | 28.7           | -15.4     | -25.5      | H           |
| 7.369 | 3.0      | 69.9         | 49.1           | 36.0    | 5.3   | -44.7  | -40.0     | 0.6      | 27.1        | 6.3        | 48.7          | 28.7           | -21.5     | -22.3      | H           |
| 9.154 | 3.0      | 65.0         | 39.0           | 37.8    | 6.2   | -43.4  | -40.0     | 0.8      | 26.3        | 0.3        | 48.7          | 28.7           | -22.3     | -28.3      | H           |

|      |                       |        |                                |         |                              |
|------|-----------------------|--------|--------------------------------|---------|------------------------------|
| f    | Measurement Frequency | Amp    | Preamp Gain                    | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna   | D Corr | Distance Correct to 3 meters   | Pk Lim  | Peak Field Strength Limit    |
| Read | Analyzer Reading      | Avg    | Average Field Strength @ 3 m   | Avg Mar | Margin vs. Average Limit     |
| AF   | Antenna Factor        | Peak   | Calculated Peak Field Strength | Pk Mar  | Margin vs. Peak Limit        |
| CL   | Cable Loss            | HPF    | High Pass Filter               |         |                              |

Note: No other emissions were found up to 10<sup>th</sup> harmonic.

# MAGNETRON 2M253J(L)

| 3/25/2005 High Frequency Measurement                           |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
|----------------------------------------------------------------|-----------------------|------------------------------------------|----------------|-----------------------|-------|---------------|--------------------------------|------------------------|-------------|---------------|---------------|-------------------|------------------------------|------------|-------------|
| Compliance Certification Services, Morgan Hill Open Field Site |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Test Engr:                                                     |                       | HITESH H. SOLANKI                        |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Project #:                                                     |                       | 05U3348                                  |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Company:                                                       |                       | SHARP ELECTRONICS CORP.                  |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| EUT Descr.:                                                    |                       | MICROWAVE OVEN                           |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| EUT M/N:                                                       |                       | OTR4 (WITH 2M253J(L) MAGNETRON)          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Test Target:                                                   |                       | FCC PART 18 SUBPART C                    |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Mode Oper:                                                     |                       | OPERATE AT FULL POWER, BOILING TAP WATER |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Test Equipment:                                                |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| EMCO Horn 1-18GHz                                              |                       |                                          |                | Pre-amplifier 1-26GHz |       |               |                                | Pre-amplifier 26-40GHz |             |               |               | Horn > 18GHz      |                              |            |             |
| T60; S/N: 2238 @3m                                             |                       |                                          |                | T86 Miteq 924341      |       |               |                                |                        |             |               |               |                   |                              |            |             |
| Hi Frequency Cables                                            |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| 2 foot cable                                                   |                       | 3 foot cable                             |                | 4 foot cable          |       | 12 foot cable |                                | HPF                    |             | Reject Filter |               | Peak Measurements |                              |            |             |
| 3_Vien                                                         |                       |                                          |                |                       |       | 12_Hitesh     |                                | HPF_4.0GHz             |             |               |               | RBW=VBW=1MHz      |                              |            |             |
| Average Measurements                                           |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| RBW=1MHz ; VBW=10Hz                                            |                       |                                          |                |                       |       |               |                                |                        |             |               |               |                   |                              |            |             |
| f GHz                                                          | Dist (m)              | Read Pk dBuV                             | Read Avg. dBuV | AF dB/m               | CL dB | Amp dB        | D Corr dB                      | Fldr dB                | Peak dBuV/m | Avg dBuV/m    | Pk Lim dBuV/m | Avg Lim dBuV/m    | Pk Mar dB                    | Avg Mar dB | Notes (V/H) |
| 4.324                                                          | 3.0                   | 70.1                                     | 39.8           | 32.8                  | 3.5   | -43.5         | -40.0                          | 0.5                    | 23.4        | -6.9          | 47.9          | 27.9              | -24.5                        | -34.8      | V           |
| 5.106                                                          | 3.0                   | 72.2                                     | 37.9           | 33.3                  | 4.0   | -44.3         | -40.0                          | 0.7                    | 25.9        | -8.4          | 47.9          | 27.9              | -22.0                        | -36.3      | V           |
| 6.873                                                          | 3.0                   | 88.0                                     | 46.6           | 35.4                  | 5.0   | -44.8         | -40.0                          | 0.6                    | 44.1        | 2.7           | 47.9          | 27.9              | -3.8                         | -25.2      | V           |
| 7.366                                                          | 3.0                   | 78.0                                     | 52.6           | 36.0                  | 5.3   | -44.7         | -40.0                          | 0.6                    | 35.2        | 9.8           | 47.9          | 27.9              | -12.7                        | -18.1      | V           |
| 8.316                                                          | 3.0                   | 82.8                                     | 42.4           | 37.1                  | 5.7   | -44.2         | -40.0                          | 0.7                    | 42.1        | 1.7           | 47.9          | 27.9              | -5.8                         | -26.2      | V           |
| 9.807                                                          | 3.0                   | 75.8                                     | 44.2           | 38.3                  | 6.6   | -42.1         | -40.0                          | 0.8                    | 39.3        | 7.7           | 47.9          | 27.9              | -8.6                         | -20.2      | V           |
| 4.324                                                          | 3.0                   | 74.2                                     | 40.0           | 32.8                  | 3.5   | -43.5         | -40.0                          | 0.5                    | 27.5        | -6.7          | 47.9          | 27.9              | -20.4                        | -34.6      | H           |
| 5.106                                                          | 3.0                   | 51.2                                     | 38.0           | 33.3                  | 4.0   | -44.3         | -40.0                          | 0.7                    | 4.9         | -8.3          | 47.9          | 27.9              | -43.0                        | -36.2      | H           |
| 6.873                                                          | 3.0                   | 91.1                                     | 40.7           | 35.4                  | 5.0   | -44.8         | -40.0                          | 0.6                    | 47.2        | -3.2          | 47.9          | 27.9              | -0.7                         | -31.1      | H           |
| 7.366                                                          | 3.0                   | 73.6                                     | 50.1           | 36.0                  | 5.3   | -44.7         | -40.0                          | 0.6                    | 30.8        | 7.3           | 47.9          | 27.9              | -17.1                        | -20.6      | H           |
| 8.316                                                          | 3.0                   | 84.5                                     | 42.2           | 37.1                  | 5.7   | -44.2         | -40.0                          | 0.7                    | 43.8        | 1.5           | 47.9          | 27.9              | -4.1                         | -26.4      | H           |
| 9.807                                                          | 3.0                   | 72.5                                     | 44.7           | 38.3                  | 6.6   | -42.1         | -40.0                          | 0.8                    | 36.0        | 8.2           | 47.9          | 27.9              | -11.9                        | -19.7      | H           |
| f                                                              | Measurement Frequency |                                          |                |                       |       | Amp           | Preamp Gain                    |                        |             |               |               | Avg Lim           | Average Field Strength Limit |            |             |
| Dist                                                           | Distance to Antenna   |                                          |                |                       |       | D Corr        | Distance Correct to 3 meters   |                        |             |               |               | Pk Lim            | Peak Field Strength Limit    |            |             |
| Read                                                           | Analyzer Reading      |                                          |                |                       |       | Avg           | Average Field Strength @ 3 m   |                        |             |               |               | Avg Mar           | Margin vs. Average Limit     |            |             |
| AF                                                             | Antenna Factor        |                                          |                |                       |       | Peak          | Calculated Peak Field Strength |                        |             |               |               | Pk Mar            | Margin vs. Peak Limit        |            |             |
| CL                                                             | Cable Loss            |                                          |                |                       |       | HPF           | High Pass Filter               |                        |             |               |               |                   |                              |            |             |

Note: No other emissions were found up to 10<sup>th</sup> harmonic.

## 6.6 CONDUCTED EMISSIONS

### LIMIT

§18.307 For the following equipment, when designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

(b) All other part 18 consumer devices:

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |            |
|-----------------------------|------------------------|------------|
|                             | Quasi-peak             | Average    |
| 0.15-0.5                    | 66 to 56 *             | 56 to 46 * |
| 0.5-5                       | 56                     | 46         |
| 5-30                        | 60                     | 50         |

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

Preliminary Conducted Emission Tests were performed according to CCS test procedure no: CCSUE2004B and EN55011/CISPR11. The following preliminary tests were conducted to determine the worst mode of operation.

| Preliminary Conducted Emission Test |         |                      |                                     |
|-------------------------------------|---------|----------------------|-------------------------------------|
| Frequency Range Investigated        |         | 150 kHz TO 30 MHz    |                                     |
| Mode of operation                   | Date    | Data Report/Plot No. | Worst Mode                          |
| Boiling tap water                   | 4/18/05 | 05U3348-1            | <input checked="" type="checkbox"/> |

Final Conducted Emission Test was conducted by operating the worst mode as indicated above.

### RESULTS

No non-compliance noted:

**6 WORST EMISSIONS:**

**MAGNETRON 2M167B**

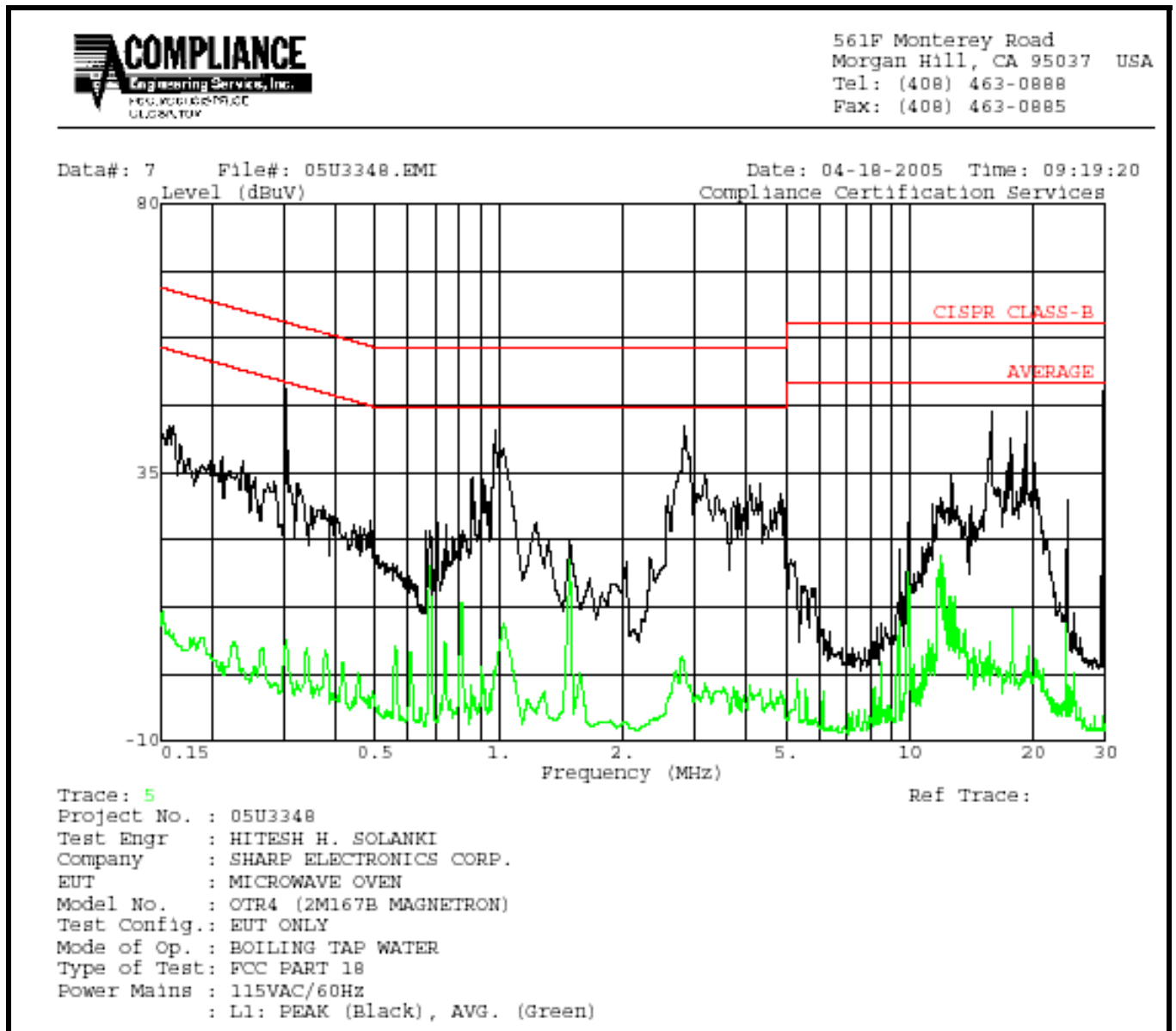
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |       |       |       |         |         |         |
|----------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                  | Reading   |           |           | Closs | Limit | FCC B | Margin  |         | Remark  |
| (MHz)                                  | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.30                                   | 49.16     | --        | 6.96      | 0.00  | 60.16 | 50.16 | -11.00  | -43.20  | L1      |
| 0.71                                   | 43.64     | --        | 19.54     | 0.00  | 56.00 | 46.00 | -12.36  | -26.46  | L1      |
| 15.80                                  | 45.34     | --        | 20.98     | 0.00  | 60.00 | 50.00 | -14.66  | -29.02  | L1      |
| 0.31                                   | 49.76     | --        | 4.37      | 0.00  | 60.05 | 50.05 | -10.29  | -45.68  | L2      |
| 0.79                                   | 45.94     | --        | 19.03     | 0.00  | 56.00 | 46.00 | -10.06  | -26.97  | L2      |
| 24.53                                  | 58.76     | --        | 22.42     | 0.00  | 60.00 | 50.00 | -1.24   | -27.58  | L2      |
| 6 Worst Data                           |           |           |           |       |       |       |         |         |         |

**MAGNETRON 2M253J(L)**

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |       |       |       |         |         |         |
|----------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                  | Reading   |           |           | Closs | Limit | FCC B | Margin  |         | Remark  |
| (MHz)                                  | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.33                                   | --        | 52.36     | 7.63      | 0.00  | 59.35 | 49.35 | -6.99   | -41.72  | L1      |
| 17.66                                  | --        | 50.58     | 14.42     | 0.00  | 60.00 | 50.00 | -9.42   | -35.58  | L1      |
| 26.00                                  | --        | 59.24     | 21.72     | 0.00  | 60.00 | 50.00 | -0.76   | -28.28  | L1      |
| 5.39                                   | 50.12     | --        | 5.73      | 0.00  | 60.00 | 50.00 | -9.88   | -44.27  | L2      |
| 20.92                                  | 49.54     | --        | 14.42     | 0.00  | 60.00 | 50.00 | -10.46  | -35.58  | L2      |
| 26.00                                  | 55.22     | --        | 21.72     | 0.00  | 60.00 | 50.00 | -4.78   | -28.28  | L2      |
| 6 Worst Data                           |           |           |           |       |       |       |         |         |         |

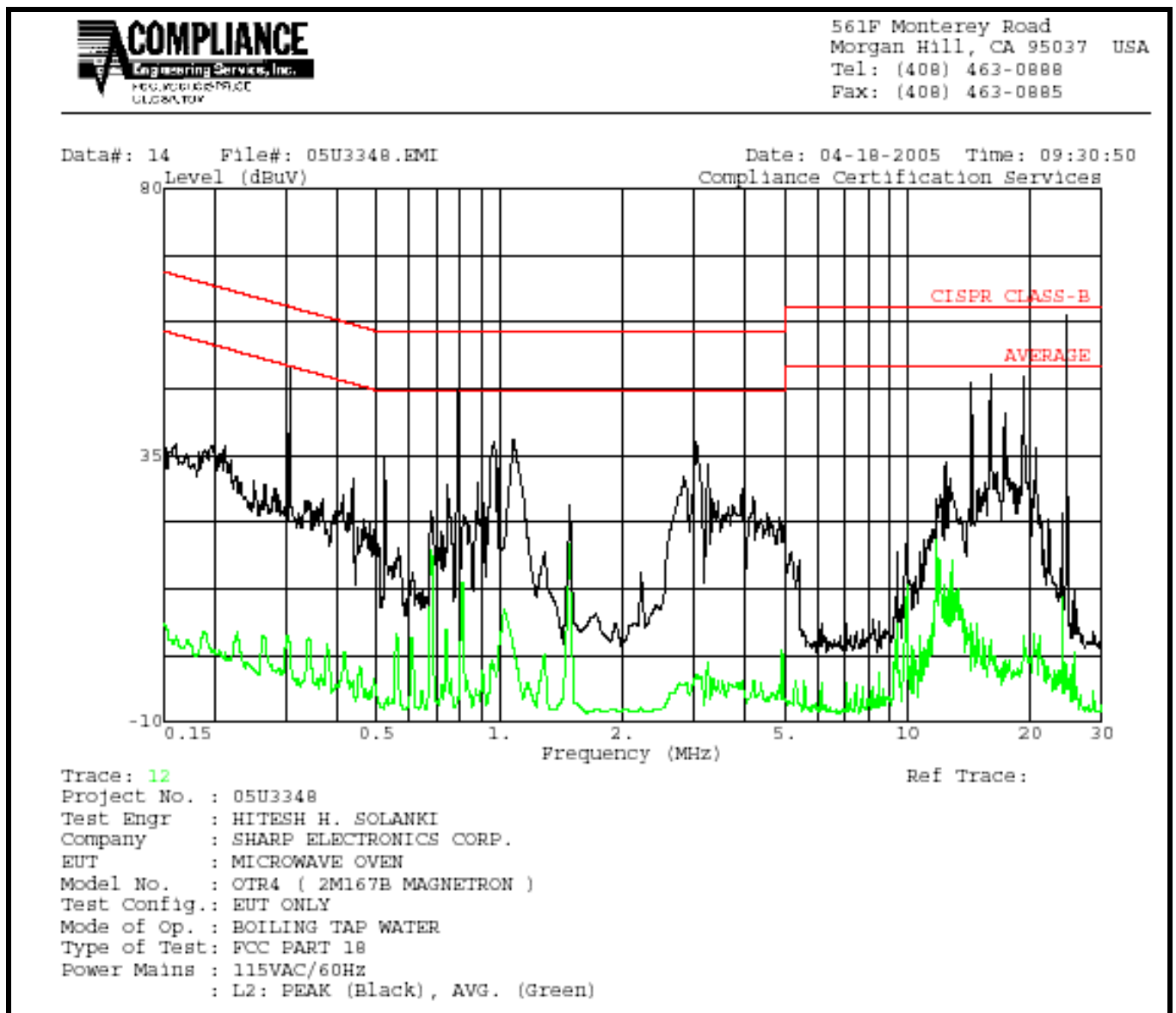
**MAGNETRON 2M167B**

**LINE 1**



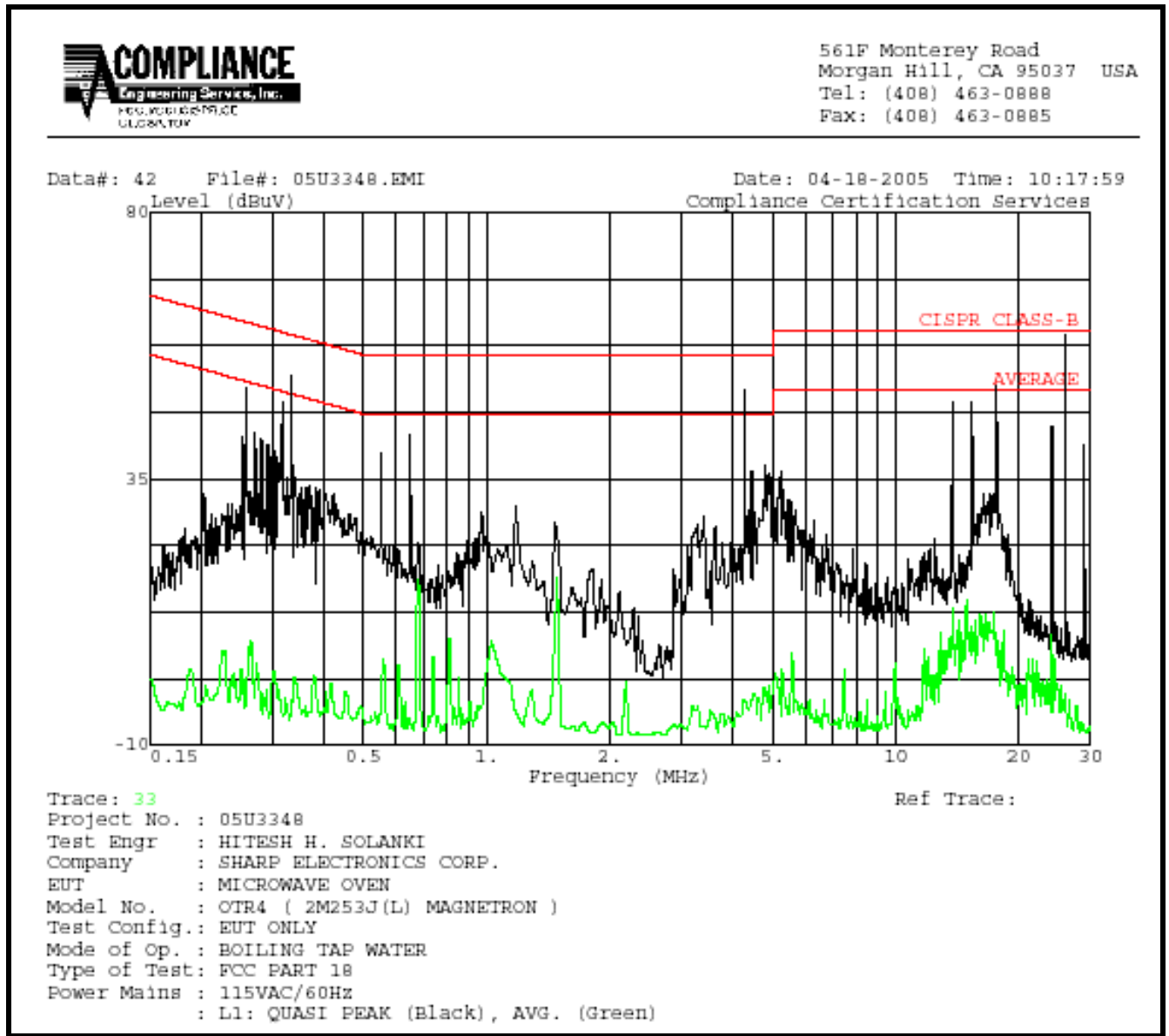
**MAGNETRON 2M167B**

LINE 2



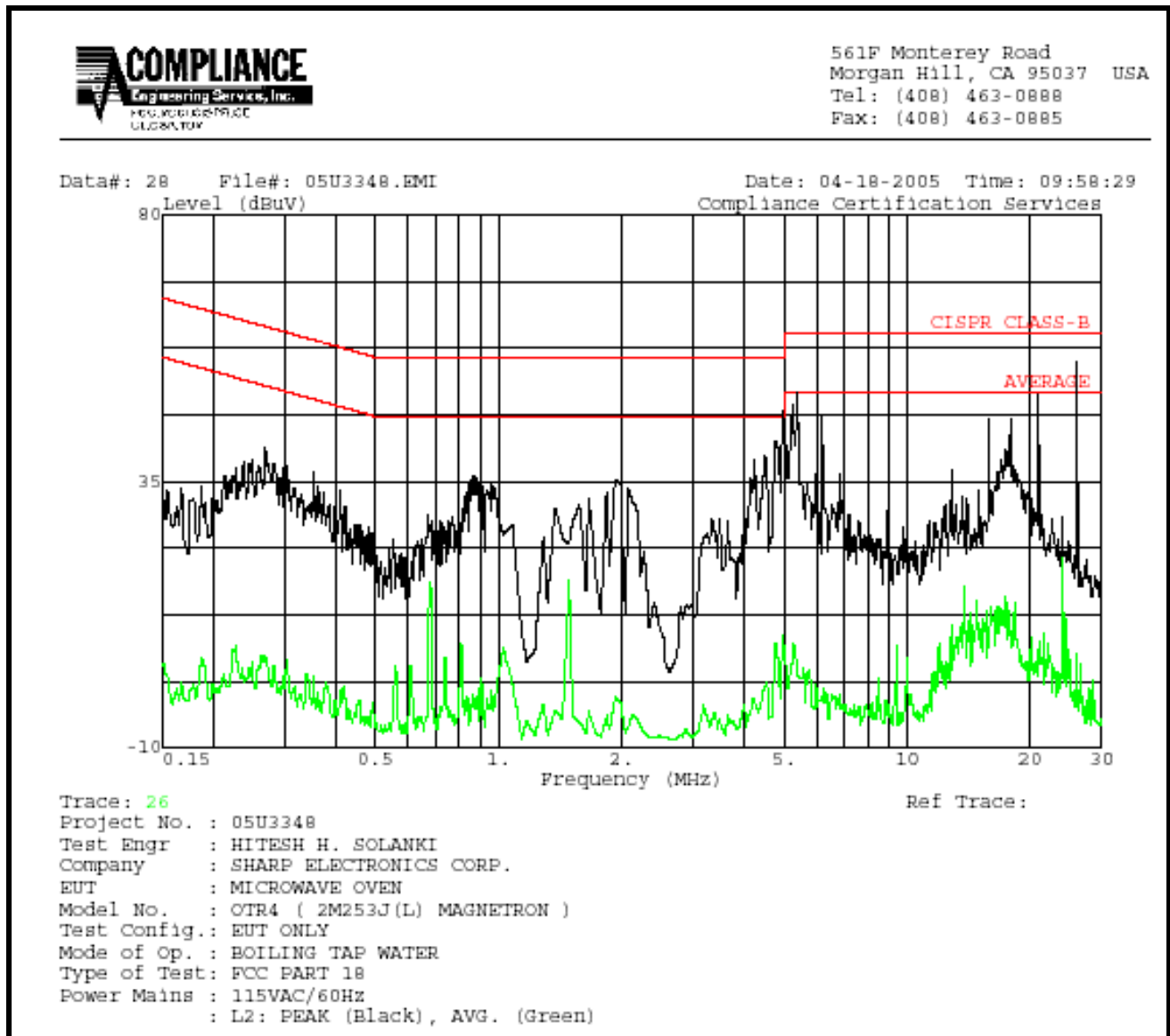
MAGNETRON 2M253J(L)

LINE 1



**MAGNETRON 2M253J(L)**

**LINE 2**



## 7 SETUP PHOTO



**Radiation Hazard Measurement**



**Operating Frequency Measurements**



**AC Line Conduction Front**



**AC Line Conduction back**



**Radiation Measurement front**



**Radiation Measurements back**

**END OF REPORT**