



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

TEST REPORT

FOR

1000W OUTPUT MICROWAVE OVENS

MODEL: HR-71000M(U), MS271EWFAN, HM09T1000

FCC ID: PKAXZHM091000W

BRAND NAME: HAIER

REPORT NUMBER: 01C0648-1

ISSUE DATE: APRIL 11, 2001

Prepared for

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Prepared by

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LAB CODE:200065-0

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- RADIATED EMISSION DATA
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- VARIATION IN OPERATING FREQUENCY VS. VOLTAGE PLOTS
- VARIATION IN OPERATING FREQUENCY WITH VOLTAGE PLOTS
- VARIATION IN OPERATING FREQUENCY WITH VOLTAGE PLOTS
- PROPOSED FCC ID LABEL
- USER MANUAL AND SCHEMATICS
- EUT PHOTOGRAPHS

1. VERIFICATION OF COMPLIANCE

COMPANY NAME : QINGDAO HAIER MICROWAVE PRODUCTION CO., LTD.

CONTACT PERSON : LI ZHANG / ENGINEER

TELEPHONE NO : 532-893-9680

EUT DESCRIPTION: 1000W MICROWAVE OVENS

MODEL NO/NAME : HR-71000M(U), MS271EWFAN, HM09T1000

DATE TESTED : MARCH 28, 2001

TYPE OF EQUIPMENT:	CONSUMER ISM EQUIPMENT
TECHNICAL LIMIT:	SUBPART C
FCC RULES:	PART 18
MEASUREMENT PROCEDURE	FCC/MP-5/1986
EQUIPMENT AUTHORIZATION PROCEDURE	CERTIFICATION
MODIFICATIONS MADE ON EUT	☐ YES ☒ NO

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 18. This said equipment in this configuration described in this report shows that maximum emission levels.

WARNING: This report documents conditions under which testing was conducted and the results of tests performed. 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 emanating from equipment are within the compliance requirements.

Tested and Reviewed By:

JESSE SALDIVAR
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

RELEASED FOR CCS BY:

STEVE CHENG
EMC ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES

2. PRODUCT DESCRIPTION

The equipment under test is a microwave oven sold for consumer use. Model: HR-71000M(U), MS271EWFAN, HM09T1000 are 1000W microwave ovens. Please refer to the following for model differences. Magnetron, SAMSUNG, Model: OM-755.

Model Differences:

Model Name	Differences	Tested (Checked)
HR-71000M(U)	ORIGINAL MODEL, WITH DIGITAL CONTROL PANEL	☒
MS271EWFAN	IDENTICAL TO ORIGINAL MODEL, FOR MARKETING PURPOSES.	☐
HM09T1000	IDENTICAL TO ORIGINAL MODEL, FOR MARKETING PURPOSES.	☐

3. TEST FACILITY

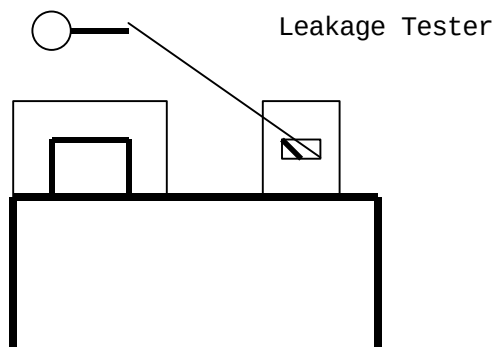
The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

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. RADIO NOISE EMISSION MEASUREMENTS PROCEDURES/RESULTS

5.1 RADIATION HAZARD MEASUREMENT



Radiation Hazard Measurements

A 1000-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 Microwave leakage probe was moved slowly around the door seams to check for leakage.

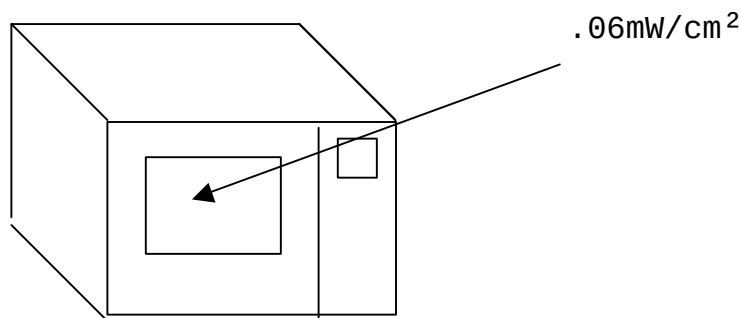


Fig. 1

<u>LOCATION</u>	<u>MAXIMUM LEAKAGE</u> <u>(mW/cm²)</u>	<u>LIMIT</u> <u>(mW/cm²)</u>
Fig.1 shows the locations of maximum leakage	.06	1.0
All others	.1	1.0

5.2 INPUT POWER

Input power and current were measured using a voltmeter and a ampmeter. 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.

<u>Input</u> <u>Voltage</u> <u>(Vac)</u>	<u>Input</u> <u>Current</u> <u>(amps)</u>	<u>Measured</u> <u>Input power</u> <u>(watts)</u>
1000W: 115.53	12.24	1371

Based on the measured input power, the EUT was found to be operating within the intended specifications.

5.3 RF OUTPUT POWER MEASUREMENT

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.

Quantity of water (ml)	Starting Temperature (C°)	Final Temperature (C°)	Elapsed Time (seconds)	RF Power (watts)
1000	20.0	38.5	120	647.5
1000	20.0	38.5	120	647.5
1000	20.0	37.5	120	612.5

Average of 3 Trials: 635.83

$$\text{Power} = \frac{(4.2 \text{ Joules/Cal}) \times (\text{Volume in ml}) \times (\text{Temp. Rise})}{\text{Time in seconds}}$$

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

5.4 OPERATING FREQUENCY MEASUREMENTS

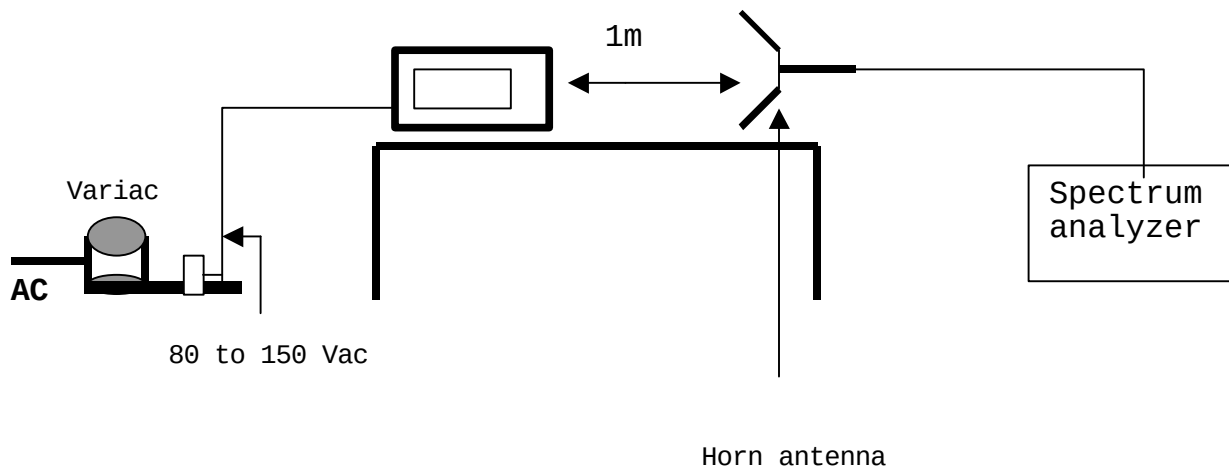


Figure 1. Operating Frequency Measurement Set-up

5.5 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 monitored 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

Maximum frequency observed: 2430 MHz
Maximum frequency allowed: 2500 MHz

Minimum frequency observed: 2428 MHz
Minimum frequency allowed: 2400 MHz

Refer to spectrum analyzer plot under ATTACHMENTS: **VARIATION IN OPERATING FREQUENCY WITH TIME PLOT** for details of frequency variation with operating time.

5.6 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:

Line voltage varied from 96Vac to 150Vac.

150Vac	Maximum frequency observed: 2479 MHz
	Maximum frequency allowed: 2500 MHz
	Minimum frequency observed: 2426 MHz
	Minimum frequency allowed: 2400 MHz
120Vac	Maximum frequency observed: 2430 MHz
	Maximum frequency allowed: 2500 MHz
	Minimum frequency observed: 2428 MHz
	Minimum frequency allowed: 2400 MHz
96Vac	Maximum frequency observed: 2469 MHz
	Maximum frequency allowed: 2500 MHz
	Minimum frequency observed: 2409 MHz
	Minimum frequency allowed: 2400 MHz

Refer to spectrum analyzer plots under ATTACHMENTS: **VARIATION IN OPERATING FREQUENCY WITH VOLTAGE PLOTS** for details of Frequency variation with operating voltage.

5.7 RADIATED EMISSIONS

Radiated emissions were measured over an inclusive frequency range to 30MHz through the tenth harmonic of the operating frequency. For this test, a 1-meter 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 - 25,000MHz, 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.

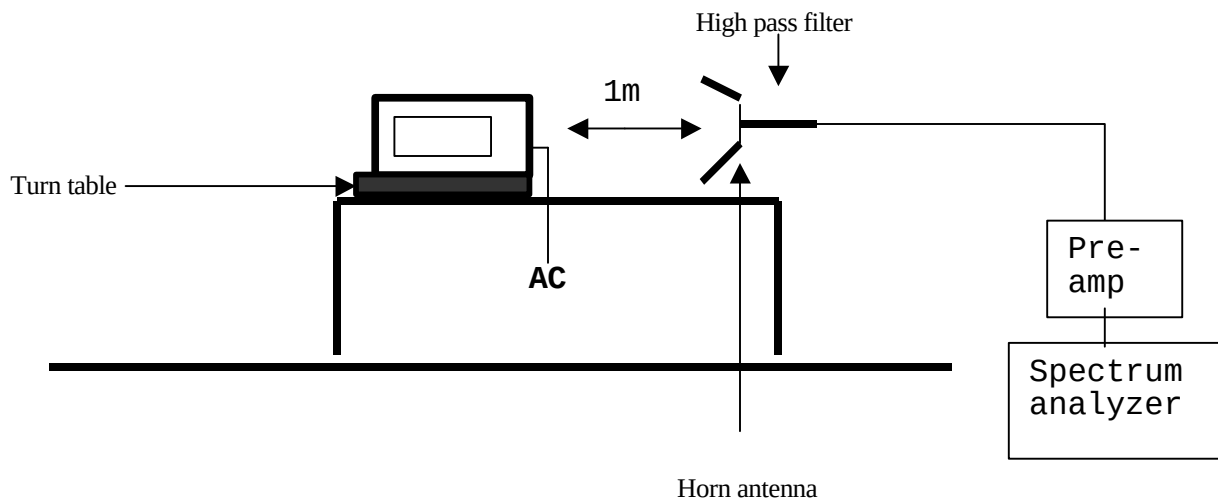


Figure 2. Radiated Emissions Configuration

There were no emissions detected from the EUT in the 30 - 1000 MHz region. Emissions detected in the 1000 - 25,000 MHz region are reported in a spreadsheet under ATTACHMENTS: **RADIATION EMISSION DATA**.

6. MEASUREMENT EQUIPMENT LIST

Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Spectrum Analyzer	H.P.	8566B	3014A06685	F	08/00	08/01
Spectrum Display	H.P.	85662A	3026A19146	F	08/00	08/01
Quasi-peak Detector	H.P.	85650A	3145A01654	F	07/00	07/01
Pre-Amp	H.P.(P2)	8447D	2944A06265	F	09/00	09/01
Antenna	EMCO	3110	8908-1079	F	10/00	10/01
Antenna	EMCO	3146	NSN=X100	F	10/00	10/01
Spectrum Analyzer	H.P.	8593EM	3710A00205	N/A	05/00	05/01
Pre-Amp	H.P. (1-26.5GHz)	8449B	3008A00369	N/A	04/00	04/01
Horn Antenna	EMCO	3115	9001-3245	N/A	12/00	12/01
Digital Multimeter	Fluke	87	4035173	N/A	11/00	11/01
Wattmeter	Valhalla	2111A	33-386	N/A	10/00	10/01
Variac(0 – 280Vac)	Powerstat	N/A	N/A	N/A	N/A	N/A

7. EUT SETUP PHOTOS



FREQUENCY VS. VOLTAGE



FREQUENCY VS. TIME



RADIATED HAZARD TEST



INPUT POWER TEST



RF POWER OUTPUT TEST



RADIATED TEST SETUP BELOW 1GHz (FRONT SIDE)



RADIATED TEST SETUP BELOW 1GHz (BACK SIDE)

REPORT NO: 01C0648-1
EUT: 1000W OUTPUT MICROWAVE OVEN

FCC ID: PKAXZHM091000W
DATE: MARCH 28, 2001

ATTACHMENTS

RADIATED EMISSION DATA

		Project #: 01C0648-1 Report #: 010328A1 Date & Time: 04/12/01 10:19 PM Test Engr: Jesse Saldivar								
FCC, VCCI, CISPR, CE, AUSTEL, NZ UL, CSA, TUV, BSMI, DHHS, NVLAP 561 F MONTEREY ROAD, MORGAN HILL CA 95037 PHONE: (408) 463-0885 FAX: (408) 463-0888										
Company: Qindao Haier Microwave Production Co., LTD. EUT Description: 1000W Microwave Oven Model: HR-71000M(U) Test Configuration: EUT Type of Test: FCC 18 Mode of Operation: Harmonic's Measurement										
☒ A-Site		☐ B-Site								
☐ C-Site		☐ F-Site								
☐ 6 Worst Data		☐ Descending								
Freq. (MHz)	Reading (dBuV)	AF (dB)	Cross (dB)	Pre-amp (dB)	Dist (dB)	Other (dB)	Level (dBuV/m)	Limit FCC 18	Margin (dB)	Pol (H/V)
2353	35.89	27.76	3.00	0.00	49.50	0.00	17.15	32.34	-15.19	H
2393	40.40	27.83	3.09	0.00	49.50	0.00	21.82	32.34	-10.52	H
4971	44.30	32.85	6.24	31.25	49.50	1.00	1.64	32.34	-30.70	H
7396	35.47	37.16	7.63	31.25	49.50	1.00	-1.49	32.34	-33.83	H
9846	35.40	37.65	9.05	31.25	49.50	1.00	0.35	32.34	-31.99	H
12296	44.50	39.18	9.07	31.25	49.50	1.00	11.00	32.34	-21.34	H
14746	47.23	40.18	11.66	31.25	49.50	1.00	17.32	32.34	-15.02	H
17176	48.71	43.26	13.26	31.25	49.50	1.00	23.48	32.34	-8.86	H
19480	41.74	32.09	14.54	31.25	49.50	1.00	6.62	32.34	-25.72	H
21915	42.80	32.50	15.76	31.25	49.50	1.00	9.31	32.34	-23.03	H
2353	47.43	27.76	3.00	0.00	49.50	0.00	28.69	32.34	-3.65	V
2393	46.20	27.83	3.09	0.00	49.50	0.00	27.62	32.34	-4.72	V
4971	47.39	32.85	6.24	31.25	49.50	1.00	4.73	32.34	-27.61	V
7396	43.68	37.16	7.63	31.25	49.50	1.00	6.72	32.34	-25.62	V
9846	44.30	37.65	9.05	31.25	49.50	1.00	9.25	32.34	-23.09	V
12296	44.80	39.18	9.07	31.25	49.50	1.00	11.30	32.34	-21.04	V
14746	46.40	40.18	11.66	31.25	49.50	1.00	16.49	32.34	-15.85	V
17176	47.10	43.26	13.26	31.25	49.50	1.00	21.87	32.34	-10.47	V
19480	48.20	32.09	14.54	31.25	49.50	1.00	13.08	32.34	-19.26	V
21915	49.50	32.50	15.76	31.25	49.50	1.00	16.01	32.34	-16.33	V

Total data #: 19
V.2a

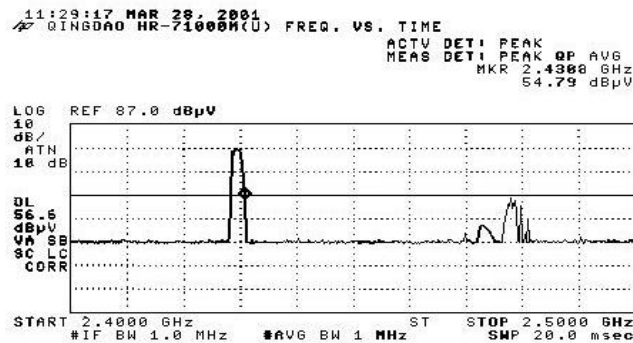
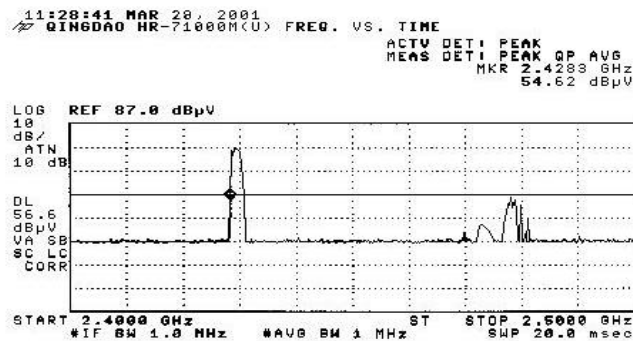
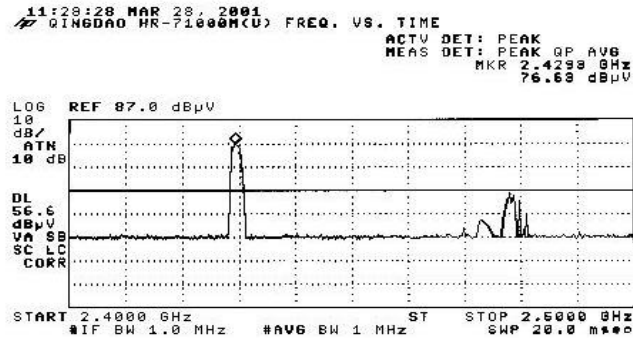
Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz

DIST: Correction to extrapolate reading to 1m specifications distance
 $20\text{dB log}(\text{dm}/\text{Ds})$ where dm = meas. Dist, Ds = specification distance

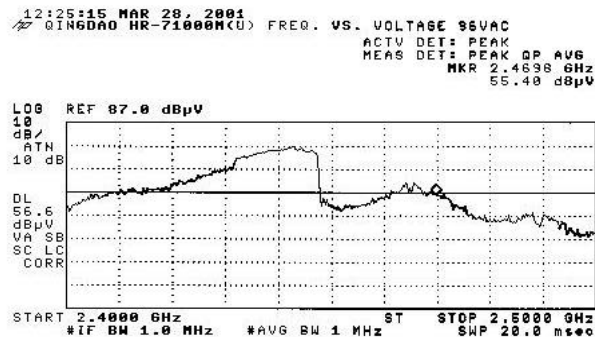
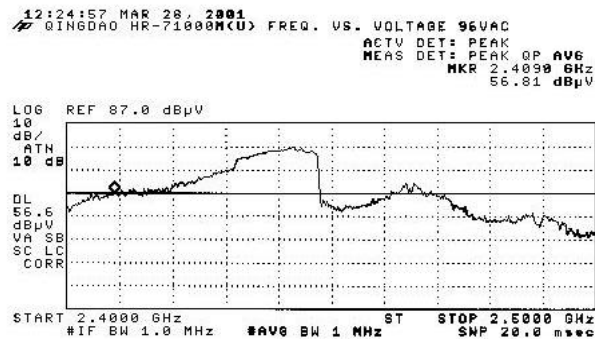
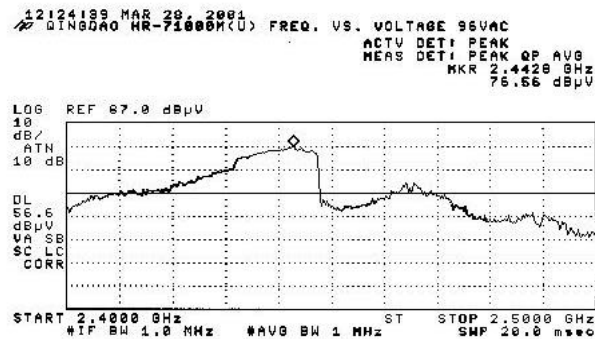
OTHER: High pass filter insertion loss

Limit (dBuV) = $20\text{log}(25\text{*SQR}(868.51/500))$ = 32.3

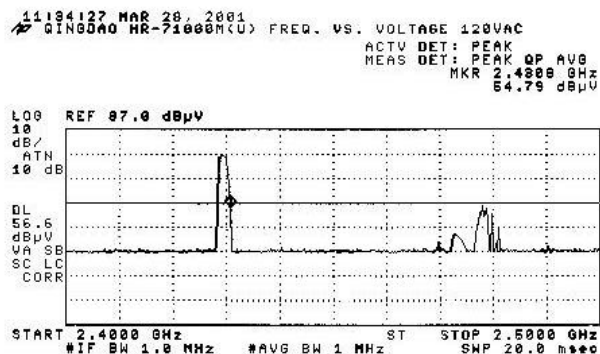
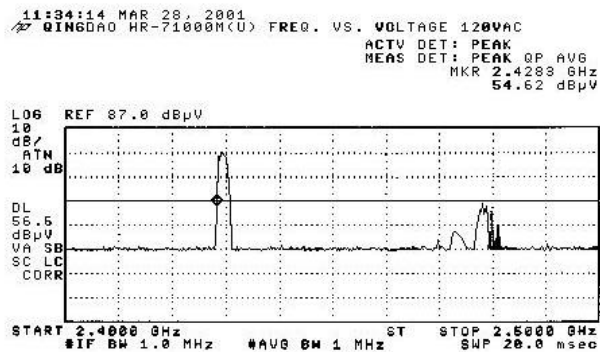
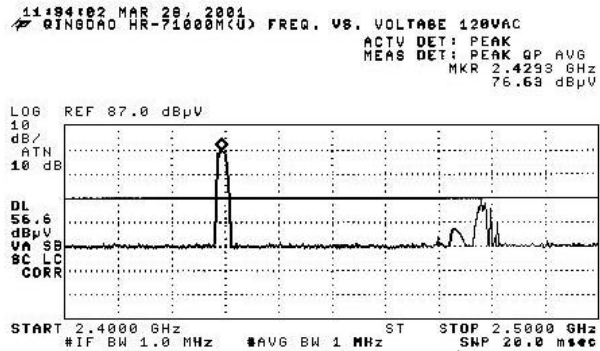
VARIATION IN OPERATING FREQUENCY VS. TIME PLOTS



VARIATION IN OPERATING FREQUENCY VS. VOLTAGE PLOTS (96VAC)

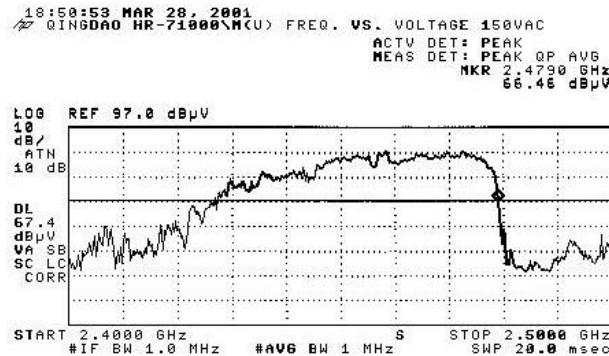
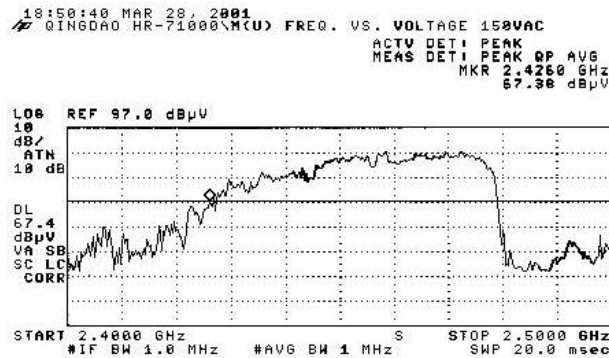
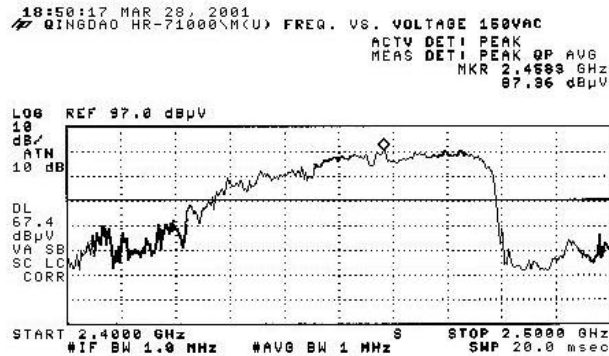


VARIATION IN OPERATING FREQUENCY VS. VOLTAGE PLOTS (120VAC)



VARIATION IN OPERATING FREQUENCY VS. VOLTAGE PLOTS (150VAC)

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REPORT NO: 01C0648-1
EUT: 1000W OUTPUT MICROWAVE OVEN

FCC ID: PKAXZHM091000W
DATE: MARCH 28, 2001

PROPOSED FCC ID LABEL

REPORT NO: 01C0648-1
EUT: 1000W OUTPUT MICROWAVE OVEN

FCC ID: PKAXZHM091000W
DATE: MARCH 28, 2001

USER MANUAL AND SCHEMATICS

REPORT NO: 01C0648-1
EUT: 1000W OUTPUT MICROWAVE OVEN

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EUT PHOTOGRAPHS