FCC CFR47 PART 18 SUBPART C
ISM EQUIPMENT
CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

700W OUTPUT MICROWAVE OVEN

MODEL: MS171EWIAR

FCC ID: PKAHR6701M02T

BRAND NAME: HAIER

REPORT NUMBER: 01C0925-1

ISSUE DATE: AUGUST 17, 2001

Prepared for

QINGDAO HAIER MICROWAVE PRODUCTION CO.,LTD
HAIER INDUSTRY,QINGDAO DEVELOPMENT DISTRICT
QINGDAO,SHANDONG 266510
PRC

Prepared by

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d.b.a.
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LAB CODE:200065-0

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ATTACHMENTS:

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- VARIATION IN OPERATING FREQUENCY VS. 96Vac PLOTS
- VARIATION IN OPERATING FREQUENCY VS. VOLTAGE 115Vac PLOTS
- VARIATION IN OPERATING FREQUENCY VS. VOLTAGE 150Vac PLOTS
- USER MANUAL AND SCHEMATICS

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1. VERIFICATION OF COMPLIANCE

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

CONTACT PERSON : ZHANG LI

TELEPHONE NO : 532-893-9680

EUT DESCRIPTION: 700 MICROWAVE OVEN

MODEL NO/NAME : MS171EWIAR

DATE TESTED : AUGUST 16, 2001

TYPE OF EQUIPMENT:	CONSUMER ISM EQUIPMENT
TECHNICAL LIMIT:	FCC PART 18 SUBPART C
FCC RULES:	PART 18
MEASUREMENT PROCEDURE	MP-5
EQUIPMENT AUTHORIZATION PROCEDURE	CLASS II PERMISSIVE CHANGE
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:

Hue Ly Vang
ASSOCIATE EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Released For CCS By:

THU CHAN
SENIOR EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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2. PRODUCT DESCRIPTION

The equipment under test was an 700Watt-microwave oven sold for consumer use Models: MIS171EWIAR. The microwave is a digitally controlled oven. With several express features. The auto defrost features allow you to cook meat, poultry, and fish evenly. A safety feature are the metal shield on the window. The screen allows cooking to be viewed while keeping microwaves confined in the oven. The Magnetron inside the EUT is a model 2M226 from LG MAGNETRON.

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))

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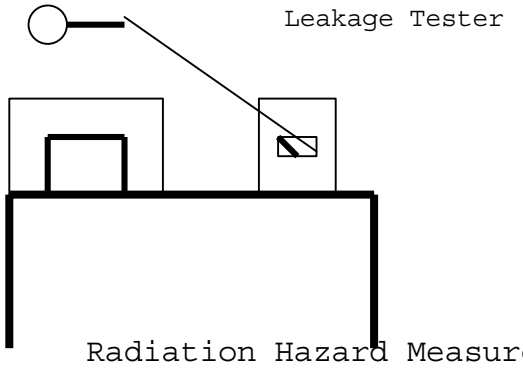
5. EQUIPMENT USED

TEST EQUIPMENTS LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Pre-Amplifier,25 dB	HP0.1 - 1300MHz	8447D (P8)	2944A06589	9/19/01
Antenna, Bilog	Chase 30 - 2000MHz	CBL6112B	2586	12/11/01
Spectrum Analyzer	HP100Hz - 22GHz	8566B	3014A06685	6/16/02
Spectrum Display	HP	85662A	3026A19146	6/16/02
Quasi-Peak Detector	HP9K - 1GHz	85650A	3145A01654	6/16/02
EMC Receiver (9K-26.5GHz)	HP	8593EM	3710A00205	5/25/02
Pre-amplifier,35.5 dB(1-26.5GHz)	HP	8449B	3008A00369	4/12/02
Horn Antenna(1 - 18GHz)	EMCO	3115	9001-3245	1/9/02
AC Power Source	ACS	AFC-10K-AFC2	J1568	N.C.R.
Microwave Leakage Tester	Simpson	380-2	N/A	11/30/02
THERMOSTAT	ERKO	N/A	N/A	N.C.R.
HIGH PASS FILTER 4.6GHz	FSY MICROWAVE	DC9943	003	N.C.R.

6. RADIO NOISE EMISSION MEASUREMENTS PROCEDURES/RESULTS

6.1 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.

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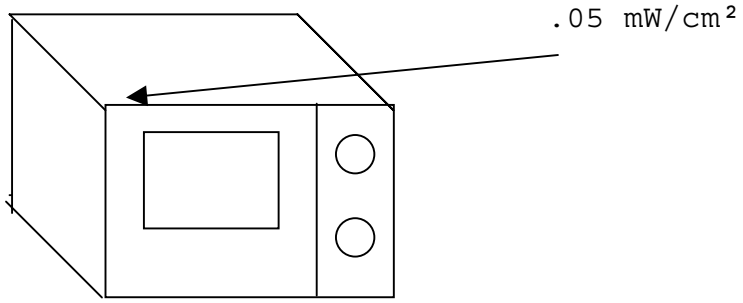

LOCATION	MAXIMUM LEAKAGE (mW/cm²)	LIMIT (mW/cm²)
Fig.1 shows the locations of maximum leakage	.05	1.0
All others	.01	1.0

6.2 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.

Input Voltage (Vac)	Input Current (Amps)	Measured Input Power(Watts)
115	8.1	931

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

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6.3 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, after a quick stir.

Starting Temperature (°C)	Final Temperature (°C)	Elapaed Time (Seconds)	RF Power (Watts)
23.3	37.20	120	486.5
22.22	37.78	120	541.8
22.78	37.78	120	522.2
Average of three trials:			516.83

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

The measured output for power less than 500 Watts. In accordance with section 18.305 of Subpart B, the measured out-of-band emissions were compared to the 25 µV/m @ 300m limit.

For the measured output was found to be greater then 500 watts. Therefore in accordance to section 18.305 of subpart B we used the following formula to determined the out of band emission.

$$\text{Limit(uV/m)} @ 300\text{meters} = 25 * \sqrt{(\text{power}/500)}$$

Serial Number	Limit (Uv/m)	Limit(dBuV/M
04	25.4	28.4

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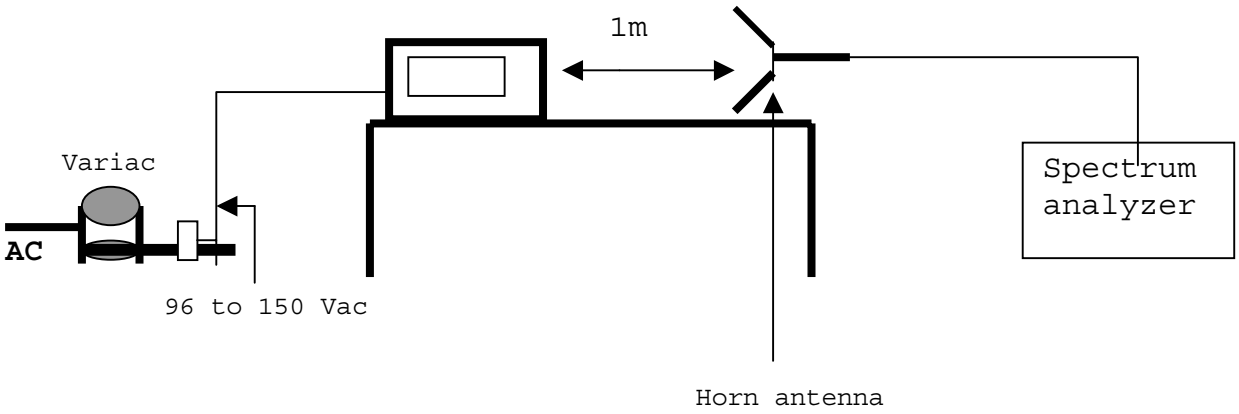
6.4 OPERATING FREQUENCY MEASUREMENTS



Operating Frequency Measurement Set-up

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

Maximum Frequency Observed	**2471 MHz**
Maximum Frequency Allowed	2500 MHz
Minimum Frequency Observed	**2449.3 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.

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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 1000 ml to 200 ml for the duration of the test. At 96 Vac 100 ml of water was dispose of every 120 second until 200 ml was reached.

The results of this test are as follows:

Line voltage varied from 96Vac to 150Vac.

	96V (GHz)	115V (GHz)	150V (GHz)
Maximun frequency (2.5GHz)	**2.492**	**2.470**	**2.469**
Minimum frequency (2.4GHz)	**2.432**	**2.449**	**2.435**

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

6.5 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.

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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.

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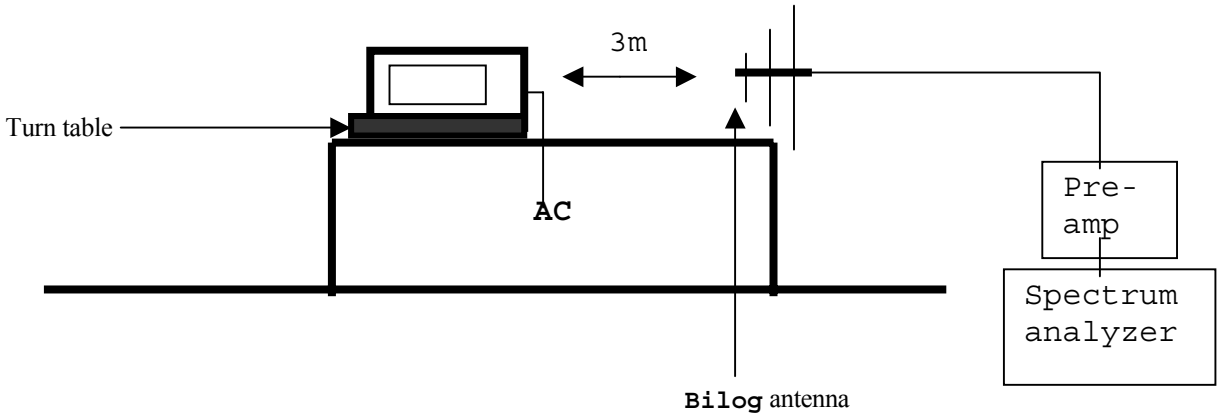
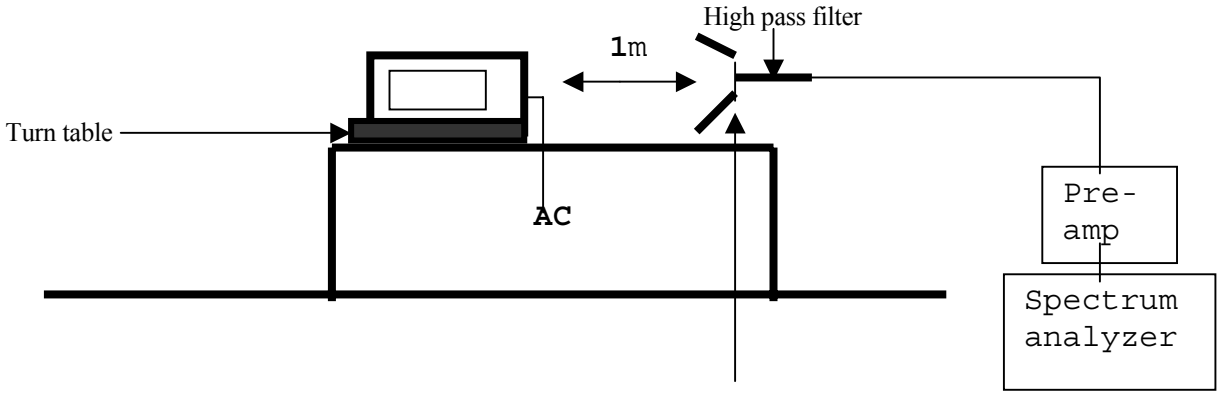


Radiated Emissions Configuration



FCC 18 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**.

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FCC B RADIATED SCAN

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UL, CSA, TUV, BSMI, DHHS, NVLAP
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PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01c925-1
Report #: 910816b
Date& Time: 08/16/01 11:20 AM
Test Engr: Hue LyVang

Company: QINGDAO HAIER MICROWAVE PRODUCTION CO., INC.
EUT Description: 750WATT MICROWAVE OVEN
Test Configuration : EUT ONLY
Type of Test: FCC CLASS B
Mode of Operation: BOILING WATER

A-Site | B-Site | C-Site | F-Site | 6 Worst Data | Descending

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
247.00	42.00	12.34	3.68	28.66	29.36	46.00	-16.64	3mV	180.00	1.00	P
515.00	33.00	17.97	5.88	29.35	27.50	46.00	-18.50	3mV	180.00	1.00	P
955.00	34.40	21.84	8.58	28.26	36.55	46.00	-9.45	3mV	180.00	1.00	P
86.00	34.00	7.60	2.07	29.37	14.30	40.00	-25.70	3mH	180.00	1.00	P
593.00	34.00	18.82	6.42	29.36	29.89	46.00	-16.11	3mH	180.00	1.00	P
856.00	32.00	20.96	8.07	28.63	32.40	46.00	-13.60	3mH	180.00	1.00	P

no signal from the EUT, taking grass level
Total data #: 6
V.2b

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FCC 18 RADIATED SCAN

COMPLIANCE Certification Services
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PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01c0885-1
Report #: 010816a
Date& Time: 08/17/01 8:07 AM
Test Engr: Hue Vang

Company: Qindao Haier Microwave Production Co., LTD.
EUT Description: Microwave Oven
Test Configuration : EUT
Type of Test: FCC 18
Mode of Operation: Harmonic's Measurement EUT boiling water

A-Site | B-Site | C-Site | F-Site | 6 Worst Data | Descending

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Dist dB	Other dB	Level (dBuV/m)	Limit FCC 18	Margin (dB)	Pol (H/V)
4900	37.00	32.85	6.24	31.25	49.50	1.00	-5.66	28.4	-34.06	H
7350	38.50	37.16	7.63	31.25	49.50	1.00	1.54	28.4	-26.86	H
9800	37.30	37.65	9.05	31.25	49.50	1.00	2.25	28.4	-26.15	H
12250	38.90	39.18	9.07	31.25	49.50	1.00	5.40	28.4	-23.00	H
14700	39.10	40.18	11.66	31.25	49.50	1.00	9.19	28.4	-19.21	H
17150	39.40	43.26	13.26	31.25	49.50	1.00	14.17	28.4	-14.23	H
19600	40.20	32.09	14.54	31.25	49.50	1.00	5.08	28.4	-23.32	H
22050	41.30	32.50	15.76	31.25	49.50	1.00	7.81	28.4	-20.59	H
4900	37.88	32.85	6.24	31.25	49.50	1.00	-4.78	28.4	-33.18	V
7350	39.59	37.16	7.63	31.25	49.50	1.00	2.63	28.4	-25.77	V
9800	38.65	37.65	9.05	31.25	49.50	1.00	3.60	28.4	-24.80	V
12250	39.46	39.18	9.07	31.25	49.50	1.00	5.96	28.4	-22.44	V
14700	38.90	40.18	11.66	31.25	49.50	1.00	8.99	28.4	-19.41	V
17150	41.10	43.26	13.26	31.25	49.50	1.00	15.87	28.4	-12.53	V
19600	42.10	32.09	14.54	31.25	49.50	1.00	6.98	28.4	-21.42	V
22050	41.30	32.50	15.76	31.25	49.50	1.00	7.81	28.4	-20.59	V

Total data #: 16
V.2a

Peak: RBW=VBW=1MHz
Average: RBW=1MHz, VBW=10Hz
***DIST**: Correction to extrapolate reading to 1m specifications distance*
20dB log(dm/Ds) where dm = meas. Dist, Ds = specification distance
OTHER: High pass filter insertion loss
Limit (dBuV) = 20*log 25*SQRT(Power/500) = 28.4

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7. EUT SETUP PHOTOS

FREQUENCY VS. TIME (Voltage) SETUP

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RADIATED HAZARD TEST

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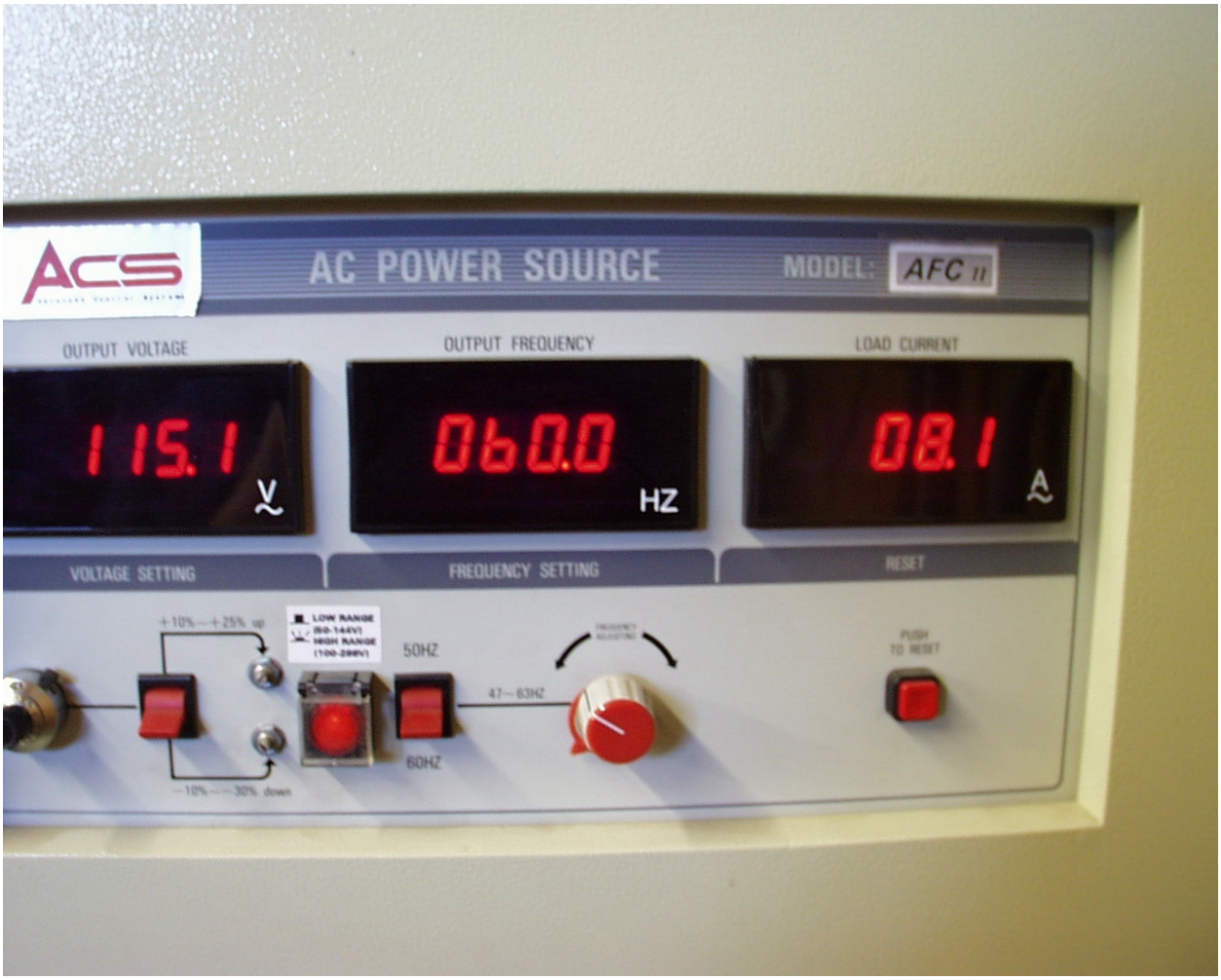

INPUT POWER TEST

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RF POWER OUTPUT

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RADIATED TEST SETUP BELOW 1GHz (BACK SIDE)

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