



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

TEST REPORT

FOR

1000W OUTPUT MICROWAVE OVENS

MODEL: WP1000L23 SERIES

FCC ID: NVZ98031000N

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ATTACHMENTS:

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

2. PRODUCT DESCRIPTION

The equipment under test is a microwave oven sold for consumer use. Model: WP1000L23 is a 1000W microwave oven with mechanical controls. Magnetron: Toshiba, Model: 2M248K. Please see the following table for other models under this series.

3. TEST FACILITY

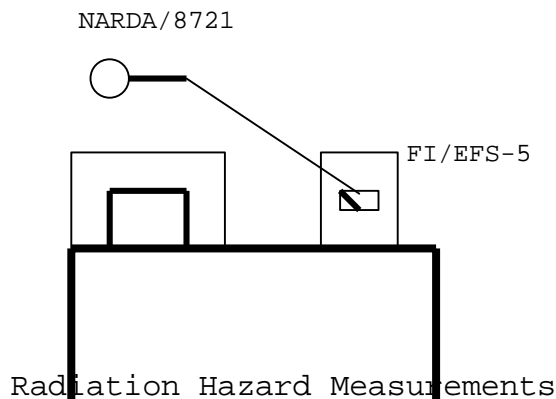
The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

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



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

LOCATION	MAXIMUM LEAKAGE (mw/cm2)	LIMIT (mw/cm2)
LOOKING AT FRONT OF MICROWAVED LEFT HAND TOP CORNER	.00165	1.0
All others	.00128	1.0

5.2 INPUT POWER

Input power and current were measured using a wattmeter and an ammeter. A 275 ml water load was placed in the center of the oven and the oven was manually set to high (100%) maximum power. A 275-ml water load was chosen for its compatibility. Manufacturers to determine their input ratings commonly use this procedure.

	<u>Input Voltage (Vac)</u>	<u>Input Current (amps)</u>	<u>Measured Input power (watts)</u>
1100W:	120	13.95	1495

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.

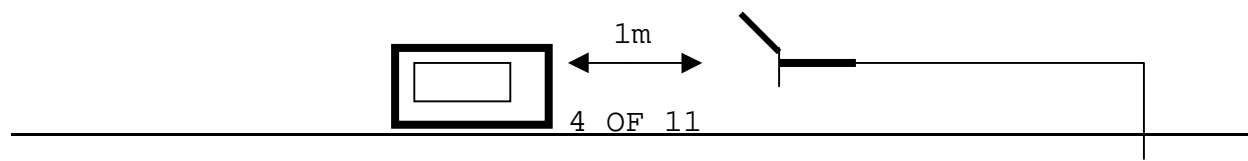
<u>Quantity of water (ml)</u>	<u>Starting Temperature (C°)</u>	<u>Final Temperature (C°)</u>	<u>Elapsed Time (seconds)</u>	<u>RF Power (watts)</u>
1000	21.7	42.2	120	717.5
1000	23.9	43.3	120	679.0
1000	22.8	40.6	120	623.0

Average of 3 Trials: 673.17

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

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 $25 \sqrt{\text{Power}/500}$ @ 300M limit.

5.4 OPERATING FREQUENCY MEASUREMENTS



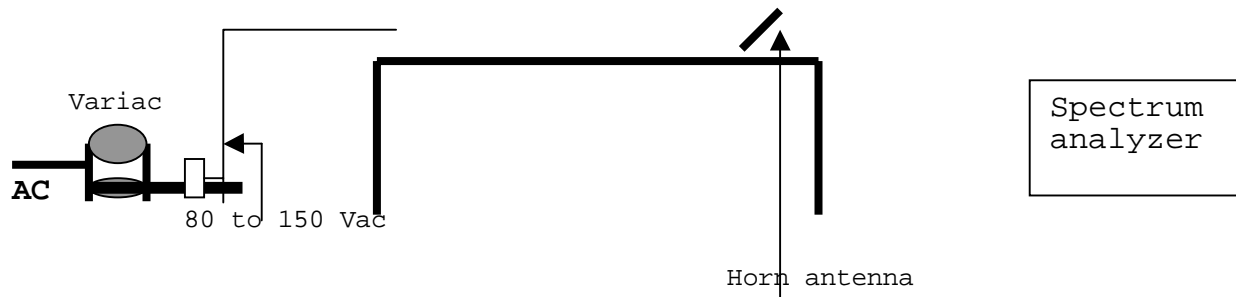


Figure 1. Operating Frequency Measurement Set-up

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: 2462 MHz
Maximum frequency allowed: 2500 MHz

Minimum frequency observed: 2452 MHz
Minimum frequency allowed: 2400 MHz

Refer to spectrum analyzer plot under ATTACHMENTS: **VARIATION IN OPERATING FREQUENCY WITH TIME PLOTS** 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: 2462 MHz
	Maximum frequency allowed: 2500 MHz
	Minimum frequency observed: 2454 MHz
	Minimum frequency allowed: 2400 MHz
96Vac	Maximum frequency observed: 2467 MHz
	Maximum frequency allowed: 2500 MHz
	Minimum frequency observed: 2452 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

Test Setup:

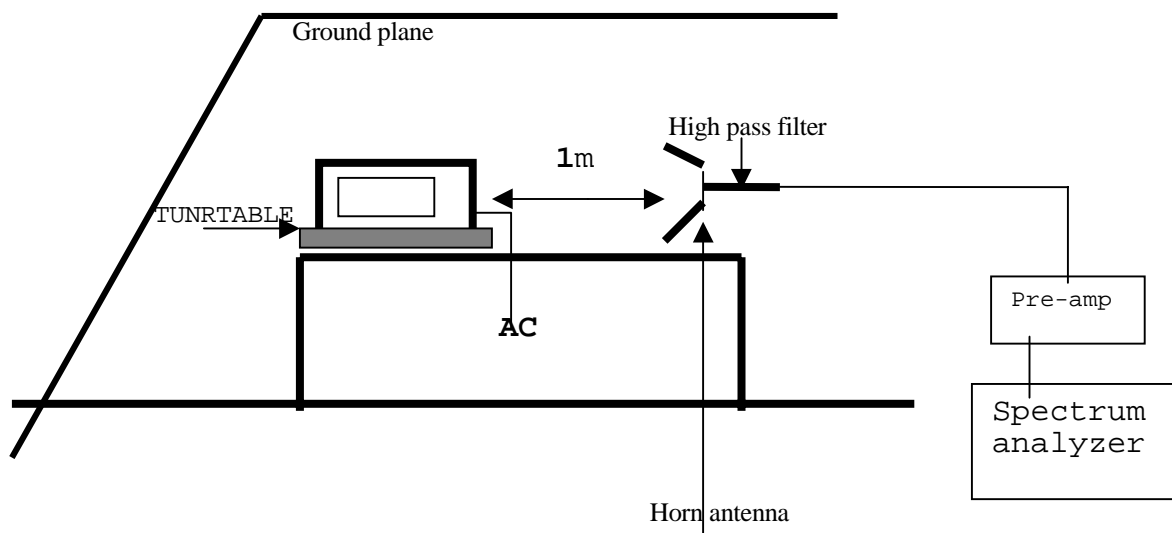


Figure 2. Radiated Emissions Configuration

Test Procedure:

Radiated emissions were measured over an inclusive frequency range to 100MHz through the sixth 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 measurement antenna was placed 10 meters for measurements from 100 - 1000MHz and 1 meter for measurements from 1000 - 14,000MHz, respectively, for the device under test. At 10 meters for the indicated frequency range was swept as the device under test was rotated along its vertical axis in 90° increments. At 1 meter, the EUT was placed on a small lazy-susan turntable and was rotated 360 degrees, with horn antenna raised and lowered 1 to 2 meters to maximize emissions radiating from Eut.

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.

Test Results:

There were no emissions detected from the EUT in the 100 - 1000 MHz region. Emissions detected in the 1000 - 14,000 MHz region are reported in a spreadsheet under ATTACHMENTS: **RADIATION EMISSION DATA.**

6. EUT SETUP PHOTOS



10 METER



1 METER



FREQUENCY STABILITY

INPUT POWER



POWER OUTPUT



RF HAZARD

7. MEASUREMENT EQUIPMENT LIST

Equipment	Manufacturer	Model No.	Serial No.	Site	Cal Date	Due Date
Spectrum Analyzer	H.P.	8566B	3014A06685	F	08/99	08/00
Spectrum Display	H.P.	85662A	3026A19146	F	08/99	08/00
Quasi-peak Detector	H.P.	85650A	3145A01654	F	07/99	07/00
Pre-Amp	H.P. (P2)	8447D	2944A06265	F	09/99	09/00
Antenna	EMCO	3110	8908-1079	F	10/98	10/99
Antenna	EMCO	3146	NSN=X100	F	10/98	10/99
Spectrum Analyzer	H.P.	8593EM	3710A00205	N/A	05/99	05/00
Pre-Amp	H.P. (1-26.5GHz)	8449B	3008A00369	N/A	04/99	04/00
Horn Antenna	EMCO	3115	9001-3245	N/A	12/97	12/00

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EUT: 1000W MICROWAVE OVENS

Digital Multimeter	Fluke	87	4035173	N/A	11/98	11/99
Wattmeter	Valhalla	2111A	33-386	N/A	10/98	10/99
Variac(0 - 280Vac)	Powerstat	N/A	N/A	N/A	N/A	N/A