

ELECTROMAGNETIC RADIATION TEST OF MICROWAVE OVEN

Report No. CALR-FCC-201

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This is to certify that the MICROWAVE OVEN from which the following data have been derived through the required measurements in Panasonic's test facility that have been filed with FCC file No. 31010/EQU 4-3-0A.

Oven Model : R-1500

Magnetron Model : 2M167

1. Power Density Safety Check

Condition	Load - Water 275cc center
Equipment	Narda 8110B
Power density	0.3 (mW/cm ²)

2. Input Power

Line Volt (V)	Input I (A)	Input Power (W)	Load Condition
120	13.8	1550	1000cc / 20 degC

3. Output Power

Condition	Water load : 1000cc / 20 deg C, Tim : 120sec		
Temp 1 (deg C)	Temp 2 (deg C)	T2 - T1 (deg C)	Output Power(W)
20.40	44.10	23.70	829.5

4. Harmonics

Harmonics	Frequency (MHz)	Load Condition	FIS(uV/m) @300m
2nd	4930	700cc center	5.25
3rd	7360	300cc center	1.38
4th	9870	700cc center	4.12

Note : 2nd and 3rd Harmonics are measured with load 300cc and 700cc in the center or right front position.

5. Permissible

Formula	$SQR(830/500) \sim 25\mu V/m @300$
Permissible	32.21

6. Side Band

Frequency (MHz)	FIS(μ V/m) @300	Load Condition
2400	5.89	700cc center
2500	0.72	700cc center

7. Frequency Run

(1) Frequency VS Line Voltage Variation Test

Test Results (Room Temperature : 20 deg C)

Line Voltage Variation (V)	Frequency (MHz)	Deviation for ISM Frequency (MHz)
150 (125%)	2465	15
135 (112.5%)	2465	15
120 (Nominal)	2466	16
108 (90%)	2465	15
96 (80%)	2464	14

Load : 1000 cc water

(2) Frequency VS Load Variation Test

Test Results (Room Temperature : 20 deg C)

Volume of water (cc)	Frequency (MHz)	Deviation for ISM Frequency (MHz)
1000	2466	16
800	2467	17
600	2467	17
400	2473	23
200	2461	11

Load : 1000 cc water

8. Fundamental Level

Frequency (MHz)	FIS(dBuV/m) @3m	Load condition
2464	110	700cc center

9. Spurious any emission < 2400MHz & > 2500MHz excluding Harmonics

Frequency (MHz)	FIS(dBuV/m) @3m	Load condition
2340	62.6	700cc center

Tested By



M. Okamoto

Applications Manager of Magnetron

Panasonic Industrial Company

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Description of Instrumentation and calculation

(1) Measurement equipment

a. Field Strength Meter : Electro-Metrics Model EMC-50

Bandwidth Setting : 1 MHz

Detector Function : Linear Average Detection

b. Receiving Antenna : Electro-Metrics Model RGA-180

Frequency Range : 1 - 18 GHz

c. Microwave Survey Meter : Narda Model 8110B

(2) Test Condition

a. Antenna Height Variation : 1.0 - 1.5 m

b. Distance of Antenna to Test unit : 3.0 m

c. Test Unit Height : 1.0 m

(3) Calculation Formula

Field Strength at 3 m (dBuV/m)

$$= \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Loss} \\ (\text{dBuV}) \quad (\text{dB/m}) \quad (\text{dB})$$

Field Strength at 300 m (dB *V/m

$$= K * 10^{\frac{\text{Field Strength at 3 m (dBuV/m)}{20}}$$

K : Conversion Factor for 3 m to 300 m

<i>Frequency</i>	<i>Antenna Factor</i>	<i>Cable Loss</i>	<i>Conv. Factor</i>
<i>(MHz)</i>	<i>(dB/m)</i>	<i>(dB)</i>	<i>K</i>
2400	29.0	0.7	0.0061
<i>Fundamental</i>	29.3	0.7	0.0062
2500	29.5	0.7	0.0063
4900	33.4	0.9	0.01
7350	36.5	1.2	0.01
9800	38.2	1.4	0.01

Example : 2nd Harmonics

Receiver Reading = 20 dB @ 3 m

$$\text{FIS} = 0.01 * 10^{\frac{20 + 33.4 + 0.9}{20}} = 5.19(\mu\text{V/m}) \\ \text{@300 m}$$