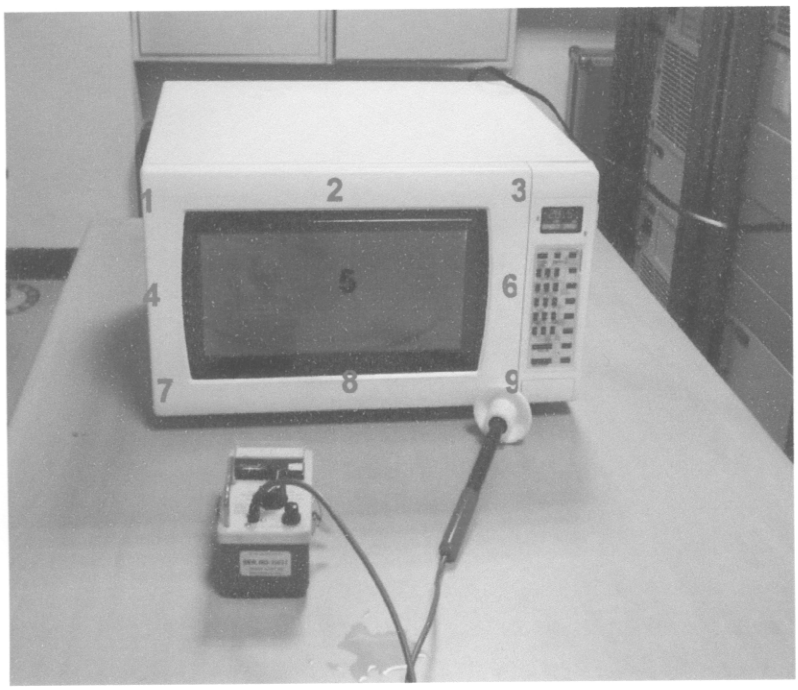
4. Radio Noise Emission Measurement Procedures/Results

4.1 Radiation Hazard Measurement

A 700-ml water load was placed in the center of the oven.
The power setting was set to maximum power.
While the oven was operating, the Microwave Survey Meter probe was moved slowly around the door seams to check for leakage.



The results of this test are as follows.

Probe Location	Maximum Leakage [mW/Cm2]	Limit [mW/Cm2]
4	0.10	1.0
7	0.10	1.0
9	0.10	1.0
All others	0.05	1.0

4.2 Input Power Measurement

Input power and current were measured using a Power Analyzer.
A 2000mL water load was placed in the center of the oven and the oven set to maximum power.
Manufacturers to determine their input ratings commonly use this procedure.

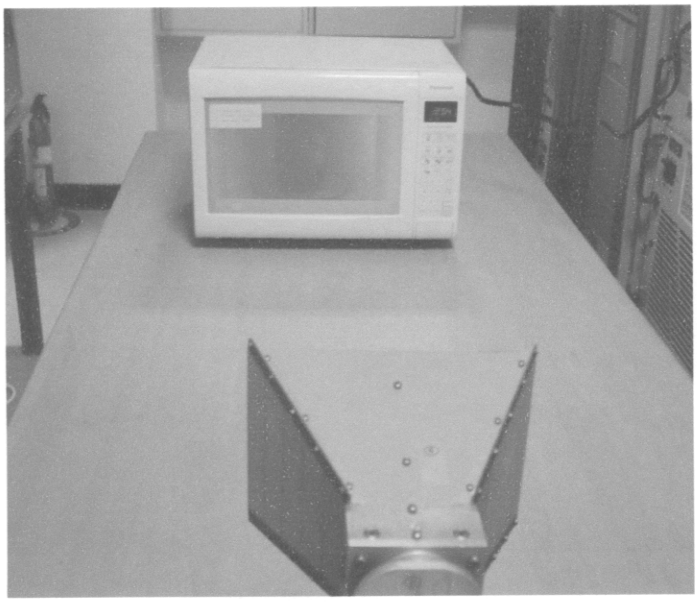


Fig. 2 Test Setup for Input power

The results of this test are as follows.

Input Voltage [Vac]	Input Current [amps]	Measured Input power [watts]	EUT Spec. Input power [watts]
120	**12.99**	**1549**	**1620**

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

4.3 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. Then the temperature of the water re-measured. (IEC 705 method)

Fig.3 Test Setup for RF output power

Quantity of water [ml]	Starting Temperature [centigrade]	Final Temperature [centigrade]	Elapsed Time [seconds]	RF Power [watts]
1000	10	19.1	33	1154.6
Average RF Power of 3 Trials				1154.6

$$\textbf{Power} = \frac{(4.187\ \text{Joules/Cal}) \times (\text{Volume in ml}) \times (\text{Temp. Rise})}{\text{Time in seconds}}$$

The measured output was found to be **ABOVE 500Watts**. Therefore, in accordance with section 18.305 of Subpart C, the measured out-of-band emissions were compared to the 25xSQRT(power/500)[uV/m] @ 300M limit.

4.4.1 Frequency Measurement

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.

Initial load : 1000 ml
Load at completion of test : 200 ml

(1) Frequence vs Line Voltage Variation Test

Maximum frequency variation:

2452.1-2456.3MHz (96 V~150 V / 1000 cc Load)

(2) Frequence vs Load Variation Test

Maximum frequency variation:

2446.0-2464.7MHz (1000 cc ~ 200 cc / 120 V)

Result : PASSED

4.5.3 Radiated Emission Measurement Data(30 - 1000MHz)

Test distance : 3m

Tested Frequency [MHz]	Meter Reading [A] [dBuV]	Total Loss [B] [dB]	Results [A+B] [dBuV/m]	Limits at 300m [dBuV/m]	ANT Pol.	Margin (Result-Limit) [dB]	Antenna Height [Cm]	Turn table Degree [Deg]
	Pk		**Pk**			**Pk**		
162.3	68.9	-14.6	54.3	71.59	H	-17.29	149	122
244.8	73.8	-11.5	62.3	71.59	V	-9.29	101	89
252.3	75.7	-10.9	64.8	71.59	H	-6.79	149	194
271.3	72.5	-9.7	62.8	71.59	V	-8.79	101	105
280.8	78.3	-9.2	69.1	71.59	H	-2.49	100	328
282.9	80.2	-9.1	71.1	71.59	V	-0.49	101	137
326.5	58.7	-8.4	50.3	71.59	H	-21.29	101	339
558.0	46.3	-3.3	43.0	71.59	H	-28.59	101	211

[NOTE]

** fo = 2450MHz*

** Test distance : 3m*

** Results = Meter Reading + Total Loss(Antenna factor + Cable loss) - Amp*

** Distance Correction factor : 20 x log(d1/d2)[dBuV/m]*

20 x log(300/3) = + 40dBuV/m

** The limit at 300 meters is* 31.59 *dBuV/m.*
Add 40dı 31.59 *dBuV/m gives a* 71.59 *dBuV/m @ 3 meters.*

** Spectrum analyzer setting*
Peak(Pk) : Resolution Bandwidth(1MHz), Video Bandwidth(1MHz)

4.5.4 Radiated Emission Measurement Data(1 - 25GHz)

Test distance : 3m

Tested Frequency [MHz]	Meter Reading [dBuV]	Total Loss [dB]	AMP [dB]	HPF [dB]	k Factor	Results [A+B] [uV/m]	Limits at 300m [uV/m]	ANT Pol.	Margin [dB]
1921	52.3	28.8	40.4	0	0.0049	0.53	31.59	V	-31.06
2088	44.5	28.8	40.4	0	0.0054	0.24	31.59	V	-31.36
2240	56.0	28.8	40.4	0	0.0058	0.96	31.59	V	-30.63
2396	72.0	30.4	40.4	0	0.0062	7.79	31.59	V	-23.81
2455	102.7	29.7		0	0.0063	26262.77	-		-
2503	63.0	30.4	40.4	0	0.0065	2.88	31.59	V	-28.71
4605	47.0	34.6	42.0	1	0.01	1.07	31.59	V	-30.52
4904	51.0	35.8	42.0	1	0.01	1.95	31.59	V	-29.64
7353	52.0	39.4	41.5	1	0.01	3.51	31.59	V	-28.09
9795	46.0	41.8	41.4	1	0.01	2.35	31.59	V	-29.24
12251	35.0	42.3	41.9	1	0.01	0.66	31.59	V	-30.93
14410	45.0	43.8	41.7	1	0.01	2.54	31.59	V	-29.05
17147	38.0	47.3	41.5	1	0.01	1.74	31.59	V	-29.86

* *fo = 2450MHz*
* ***Total Loss** : Antenna Factor+ Cable Loss, **HPF** : High Pass Filter(4.5GHz)*
* ***AMP** : Pre-amplifier*
* *The limit at 300 meters is 25 * $\sqrt{\ }$ (RF Power/500)*
* *Results : Field Strength abobe 1000MHz (at 300m)(uV/m) = K*10$^{[\text{Field strengh at 3m(dBuV/m)}/20]}$*
* *Margin = Result-Limit*

[NOTE]

1. *Load for measurement of radiation on second and third harmonic : Two loads, one of 1000ml and the other of 450ml, of water were used. Each load was tested both with the beaker located in the center of the oven and with it in the corner.*

2. *In the frequency range fo the 3rd harmonics to 10th harmonics, emission from the EUT at 3m distance was measured and the level was lower than the floor noise level of 10dBuV/m.*

* *k : Conversion Factor*
  *K = 0.0137 * logF - 0.0401 (if F < 4575 MHz)*
  K = 0.01 (if F ≥ 4575 MHz)
  F = Meter Reading Frequency