

EMC EMISSION - **TEST REPORT**

JQA APPLICATION No. : KL80040170

Name of Product : Electric Range with Microwave Drawer

Model/Type No. : KB-3300JS

FCC ID : APYDMR0146

Applicant : Sharp Corporation, Reliability Control Group

Address : 22-22, Nagaike-cho, Abeno-ku, Osaka 545-8522, Japan

Manufacturer : Sharp Manufacturing Co. of America

Address : Sharp Plaza Blvd. Memphis, TN 38193, U.S.A.

Receive date of EUT : July 14, 2004

Final Judgement : **Passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) under METI Japan and National Institute of Information and Communications Technology (NICT) under MPHPT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

Authorized by:



Takashi Yamanaka, Director
JQA KITA-KANSAI Testing Center

DIRECTORY

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TEST REGULATION

FCC Rules and Regulations Part 18 Subpart A, B and C (October 1, 2003)

- - Miscellaneous equipment
- - Medical diathermy
- - Industrial heaters and RF stabilized arc welder
- - Induction cooking ranges
- - ISM Frequency Device
- - Non-ISM Frequency Device

Test procedure:

The test was performed according to the procedures in FCC/OET MP-5 (1986).

GENERAL INFORMATION

Test facility:

- 1) Test Facility located at Kita-Kansai : 1st Open Site (3 m Site)
Test Facility located at Kameoka : 1st Open Site (3, 10 and 30 m, on common plane)
: 2nd Open Site (3 and 10 m, on common plane)

FCC filing No. : 31040/SIT 1300F2

- 2) KITA-KANSAI TESTING CENTER is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regulations.

NVLAP Lab Code: 200191-0

- 3) Average Measurement Method
FCC filing No. : 950523A 1300F2

Description of the Equipment Under Test (EUT):

- 1) Name : Electric Range with Microwave Drawer
- 2) Model/Type No. : KB-3300JS
- 3) Product Type : Prototype
- 4) Category : ISM Frequency Device
- 5) EUT Authorization : ○ - Verification ● - Certification ○ - D.o.C.
- 6) Highest frequency used/generated : 2450 MHz
- 7) Rated RF Power Output : 1000 W
- 9) Power Rating : AC 208/240V 60Hz

Definitions for symbols used in this test report:

- - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- - Blank box indicates that the listed condition, standard or equipment is not applicable for this Report.

TEST CONDITIONS

RF Power Output Measurement

was performed in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

- - Shielded room
- - Anechoic chamber
- - 1st open test site

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- - Shielded room
- - 1st open test site
- - 2nd open test site

Used test instruments:

Model No.	Assigned C/N	Last Cal. Date	Cal. Interval
● - 2533-21	08011090	June, 2004	1 Year
● - 245506	Q47097361	March, 2004	1 Year
● - SIII-5000	Q47097350	February, 2004	1 Year

Environmental conditions:

Temperature: 24 °C Humidity: 50 %

ISM Frequency Measurement

was performed for line voltage variation from 80 % to 125 % of normal rated voltage, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

- - Shielded room
- - Anechoic chamber
- - 1st open test site

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- - Shielded room
- - 1st open test site
- - 2nd open test site

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - 8566B	A - 13	March, 2004	1 Year
○ - 8593A	A - 15		
○ - 4T-10	D - 73		
○ - 4T-10	D - 74		
○ - WJ-6611-513	A - 23		
○ - WJ-6882-824	A - 21	May, 2004	1 Year
○ - DBL-0618N515	A - 33		
○ - 91888-2	C - 41 - 1		
● - 91889-2	C - 41 - 2		
○ - 94613-1	C - 41 - 3		
○ - 91891-2	C - 41 - 4	March, 2004	1 Year
○ - 94614-1	C - 41 - 5		
○ - 2-10	D - 40		
● - TR5212	B - 30		
● - Cable	C - 40 - 11		
○ - Cable	C - 40 - 12	May, 2004	1 Year

Environmental conditions:

Temperature: 27 °C Humidity: 60 %

AC Powerline Conducted Emission Measurement

was performed in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

○ - On metal plane of open site

Used test instruments and sites:

Model No.	Device ID	Last Cal. Date	Cal. Interval
○ - ESCS 30	A - 1		
○ - ESCS 30	A - 9		
● - ESH 2	A - 2	May, 2004	1 Year
○ - ESH 2	A - 3		
○ - KNW-407	D - 6		
● - KNW-408	D - 11	October, 2003	1 Year
○ - KNW-242	D - 7		
○ - ESH3-Z5	D - 12		
○ - KNW-341C	D - 13		
○ - KNW-408	D - 14		
○ - KNW-244C	D - 77		
○ - KNW-408	D - 78		
○ - ESH2-Z5	D - 10		
○ - ESH2-Z3	D - 17		
○ - 65 BNC-50-0-1	H - 26		
○ - 65 BNC-50-0-1	H - 27		
○ - Cable	H - 7		
● - Cable	H - 8	October, 2003	1 Year

Environmental conditions:

Temperature: 26 °C Humidity: 72 %

Magnetic Field Radiated Emission Measurement

was performed in the frequency range of 9 kHz - 30 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - 1st open test site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - 1st open test site ○ - 3 m ○ - 10 m ○ - 30 m
○ - 2nd open test site ○ - 3 m ○ - 10 m

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - ESCS 30	A - 1	August, 2003	1 Year
○ - ESCS 30	A - 9		
○ - ESH 2	A - 2		
○ - ESH 2	A - 3		
● - HFH2-Z2	C - 2	July, 2004	1 Year
○ - HFH2-Z2	C - 3		
● - Cable	H - 28	July, 2004	1 Year
○ - Cable	H - 29		

Environmental conditions:

Temperature: 27 °C Humidity: 56 %

Electromagnetic Field Radiated Emission Measurement

was performed in horizontal and vertical polarization, in the frequency range of 30 MHz - 1000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

○ - 1st open test site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

● - 1st open test site ○ - 3 m ● - 10 m ○ - 30 m

○ - 2nd open test site ○ - 3 m ○ - 10 m

Validation of Site Attenuation:

1) Last Confirmed Date : November 18, 2003

2) Interval : 1 Year

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
○ - ESV/ESV-Z3	A - 7 / A - 17		
○ - ESV/ESV-Z3	A - 6 / A - 18		
○ - ESV/ESV-Z3	A - 4 / A - 20		
● - ESV/ESV-Z3	A - 8 / A - 19	May, 2004	1 Year
○ - ESVS 10	A - 5		
○ - KBA-511A	C - 11		
○ - KBA-611	C - 21		
○ - VHA9103/BBA9106	C - 43		
○ - UHALP9107	C - 42		
● - VHA9103/FBAB9177	C - 25	August, 2003	1 Year
● - UHALP9108-A1	C - 28	August, 2003	1 Year
● - Cable	H - 2	August, 2003	1 Year

Environmental conditions:

Temperature: 30 °C Humidity: 56 %

Electromagnetic Field Radiated Emission Measurement

was performed in horizontal and vertical polarization, in the frequency range of 1 GHz - 26 GHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan

● - 1st open test site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - 1st open test site ○ - 3 m ○ - 10 m ○ - 30 m

○ - 2nd open test site ○ - 3 m ○ - 10 m

Used test instruments:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - ESCS 30	A - 1	August, 2003	1 Year
○ - ESCS 30	A - 9		
● - 8566B	A - 13	March, 2004	1 Year
○ - 8593A	A - 15		
● - 4T-10	D - 73	May, 2004	1 Year
● - 4T-10	D - 74	May, 2004	1 Year
● - WJ-6611-513	A - 23	May, 2004	1 Year
● - WJ-6882-824	A - 21	May, 2004	1 Year
● - DBL-0618N515	A - 33	May, 2004	1 Year
● - 91888-2	C - 41 - 1	May, 2004	1 Year
● - 91889-2	C - 41 - 2	May, 2004	1 Year
● - 94613-1	C - 40 - 3	May, 2004	1 Year
● - 91891-2	C - 40 - 4	May, 2004	1 Year
● - 94614-1	C - 40 - 5	May, 2004	1 Year
● - 3160-09	C - 48	December, 2003	1 Year
● - 355C / 355D	D - 22 / D - 23	March, 2004	1 Year
● - MZ5010C	D - 81	December, 2003	1 Year
● - 8673D	B - 2	April, 2004	1 Year
● - Cable	C - 40 - 11	May, 2004	1 Year
● - Cable	C - 40 - 12	May, 2004	1 Year

Environmental conditions:

Temperature: 27 °C Humidity: 56 %

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
Electric Range with Microwave Drawer	Sharp Corporation (Sharp Manufacturing Co. of America)	KB-3300JS (--)	APYDMR0146

The measurement was carried out with the following equipment connected:

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
None			

Type of Interference Cable(s) and the AC Power Cord used with the EUT:

	Description	Port	Shielded Cable	Shell Material	Ferrite Core	Cable Length
1	AC Power Cord (EUT) 1 ϕ 3-pin Plug	--	NO	--	NO	1.0 m

Operation - mode of the EUT:

The EUT was operated during the measurement under following load condition according to Sec. 4.1 in FCC/OET MP-5 (1986).

- 1) RF Power Output Measurement
1000 ml of water, with the beaker located in the center of the food container.
- 2) ISM Frequency Measurement
1000 ml of water, with the beaker located in the center of the food container.
- 3) Radiated Emission Measurement (radiation on second and third harmonics)
Two loads, one of 700 ml and the other of 300 ml, of water are used. Each load is tested both with the beaker located in the center of the food container and with it in the right front center.
- 4) All Other Measurement (conducted and radiated emission)
700 ml of water, with the beaker located in the center of the food container.

Test system:

The EUT is an electric range with microwave drawer intended for the household use.
There is not any interface ports on the EUT.

Special accessories:

None

Type of Magnetron:

Cat. No. 2M253H(L) (manufactured by Toshiba Corporation)

The used (generated) frequencies in the EUT:

Magnetron : 2450 MHz
CPU : 4 MHz

EUT Modification

- - No modifications were conducted by JQA to achieve compliance to applied levels.
- - To achieve compliance to applied levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A
Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsible party :

Contact Person :

Signatory

Deviation from Standard

- - No deviations from the standard described in page 3.
- - The following deviations were employed from the standard described in page 3.

TEST RESULTS

RF Power Output

Measurement Results (Calorimetric method) 716 W

Applied Limits of Radiated Emission 29.9 $\mu\text{V}/\text{m}$ at 300 m
10.0 $\mu\text{V}/\text{m}$ at 1600 m

Remarks: _____

ISM Frequency 2.4 GHz - 2.5 GHz

The requirements are **● - Passed** ○ - Not Passed

Worst (lowest/highest) range 2411.60 MHz - 2470.40 MHz
against 2.45 GHz \pm 50 MHz

Uncertainty of measurement results \pm 100 kHz

Remarks: _____

AC Powerline Conducted Emission 150 kHz - 30 MHz

The requirements are **● - Passed** ○ - Not Passed

Min. limit margin 3.4 dB at 12.60 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results + 2.1 dB(2 σ) - 2.1 dB(2 σ)

Remarks: _____

Magnetic Field Radiated Emission 9 kHz - 30 MHz

The requirements are	● - Passed	○ - Not Passed
Min. limit margin	<u>32.7</u> dB at <u>5.00</u> MHz	
Max. limit exceeding	<u> </u> dB at <u> </u> MHz	
Uncertainty of measurement results	<u>+ 2.5</u> dB(2σ)	<u>- 2.5</u> dB(2σ)

Remarks: _____

Electromagnetic Field Radiated Emission 30 MHz - 1000 MHz

The requirements are	● - Passed	○ - Not Passed
Min. limit margin	<u>31.5</u> dB at <u>398.3</u> MHz	
Max. limit exceeding	<u> </u> dB at <u> </u> MHz	
Uncertainty of measurement results	<u>+ 3.8</u> dB(2σ)	<u>- 3.9</u> dB(2σ)

Remarks: _____

Electromagnetic Field Radiated Emission 1 GHz - 26 GHz

The requirements are	● - Passed	○ - Not Passed
Min. limit margin	More than <u>9.5</u> dB at <u>19740.0</u> MHz	
Max. limit exceeding	<u> </u> dB at <u> </u> MHz	
Uncertainty of measurement results	<u>+ 3.2</u> dB(2σ)	<u>- 3.2</u> dB(2σ)

Remarks: _____

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 18 Subpart A, B and C (October 1, 2003) under the test configuration, as shown in page 16.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;

- - fulfill the test requirements of the regulation mentioned on page 3.
- - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.
- - doesn't fulfill the test regulation mentioned on page 3.

Begin of testing : July 19, 2004

End of testing : August 2, 2004

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by :

Issued by :

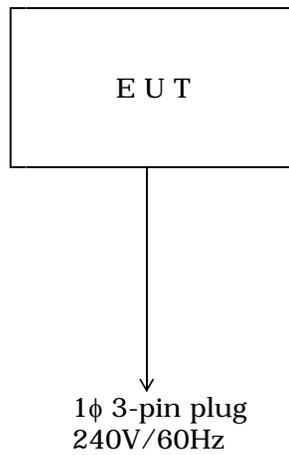


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EMC Div.
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Shigeru Kinoshita
Deputy Manager
EMC Div.
JQA KITA-KANSAI Testing Center

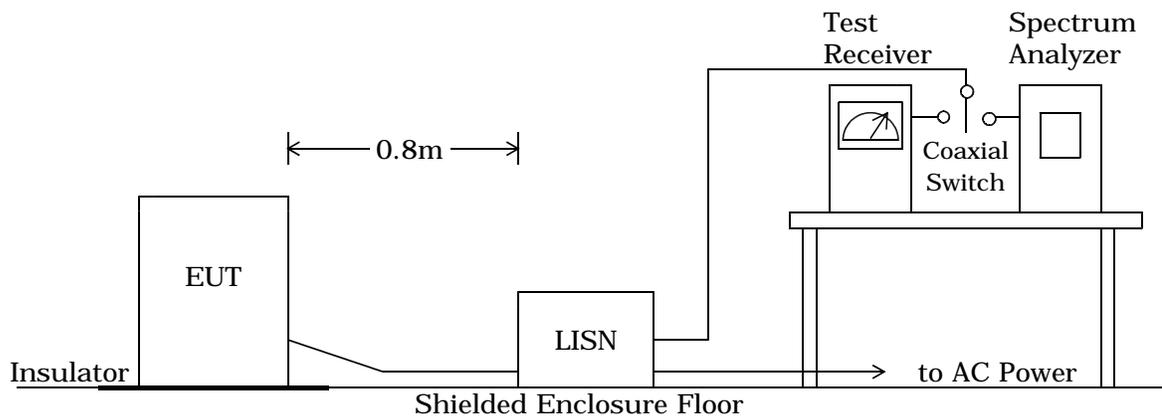
Test System-Arrangement (Drawings)



Test-setup(Drawings)

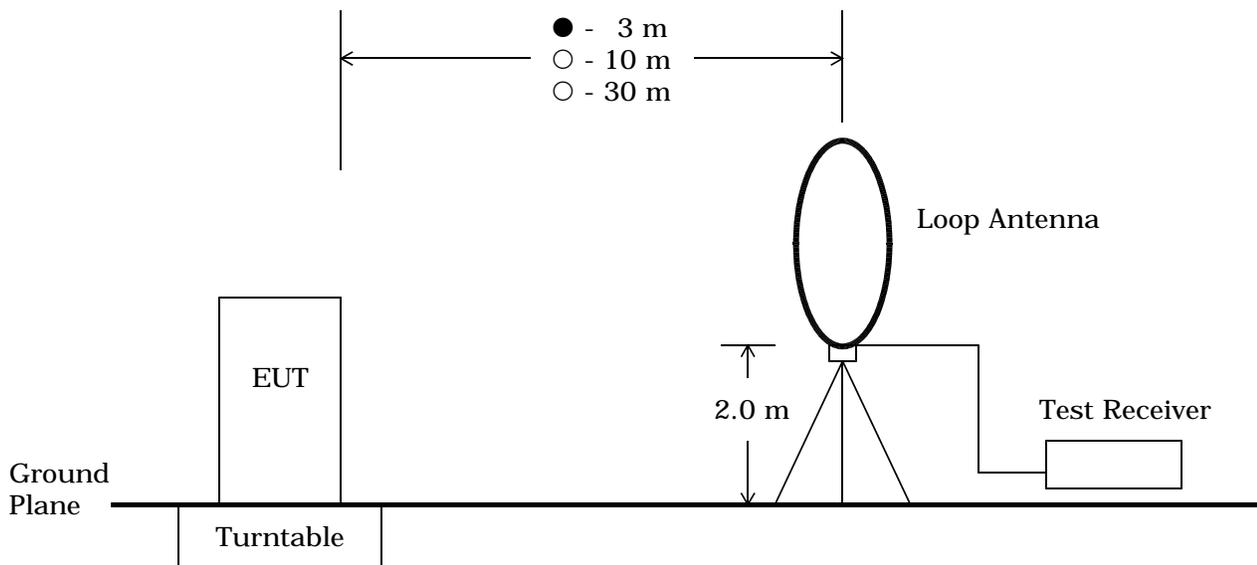
Conducted Disturbance 150 kHz - 30 MHz:

The test was performed according to the description of FCC/OET MP-5 (1986) Sec.7.0 (Conducted Powerline Measurements).



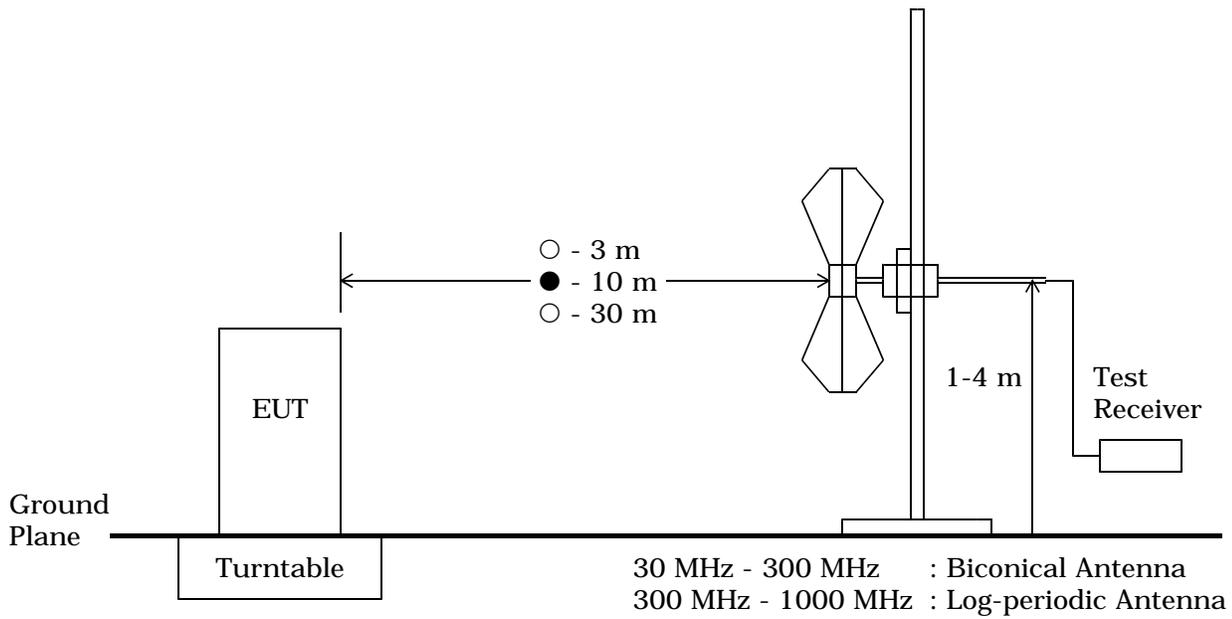
Magnetic Field Radiated Emission 9 kHz - 30 MHz:

The test was performed according to the description of FCC/OET MP-5 (1986) Sec.5.0 (Radiated Emissions Measurements for Certified Equipment).



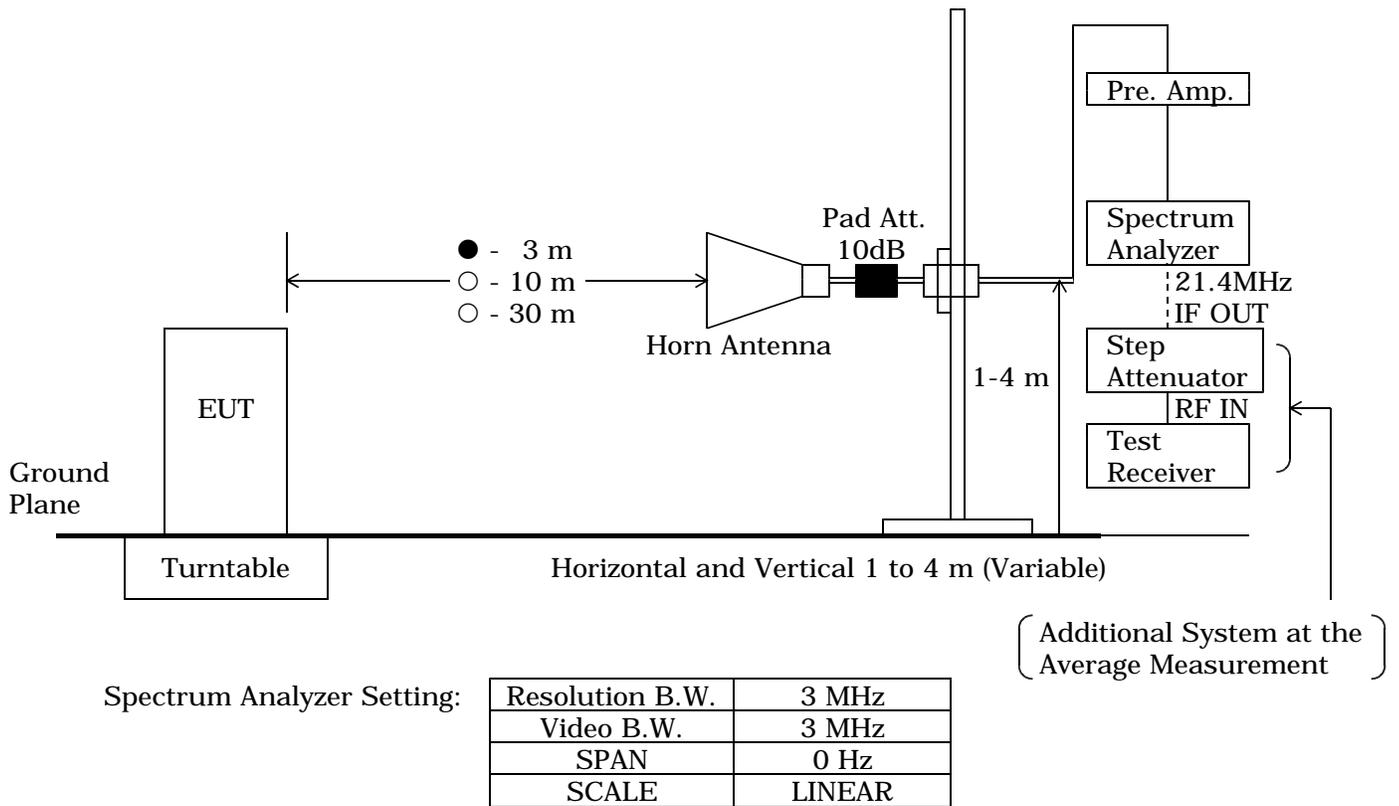
Electromagnetic Field Radiated Emission 30 MHz - 1000 MHz:

The test was performed according to the description of FCC/OET MP-5 (1986) Sec.5.0 (Radiated Emissions Measurements for Certified Equipment).



Electromagnetic Field Radiated Emission 1 GHz - 26 GHz:

The test was performed according to the description of FCC/OET MP-5 (1986) Sec.5.0 (Radiated Emissions Measurements for Certified Equipment).



Test-Setup (Photographs) at worst case

Conducted Emission 150kHz - 30MHz:



Rear View

Radiated Emission 9kHz - 26GHz:



Front View



Rear View

RF Power Output Measurement ISM Frequency Device

Test Date: August 2, 2004
Temp.: 24 °C ; Humi.: 50 %

The power output was measured by the calorimetric method, computing the power output from the observed temperature rise of the load over a period of time.

Load (water) : 1000 ml
Measurement time : 42.0 sec. (calculated by the rated RF power output)

No.	Water temperature [°C]		RF Power Output (※) [W]
	t ₁ (before test)	t ₂ (after test)	
1	9.2	16.8	760
2	9.2	15.8	660
3	8.8	16.0	720
4	9.6	16.7	710
5	9.4	16.7	730
Average			716

※) RF Power Output [W] = $4.2 \times 1000 \times (t_2 - t_1) / 42.0$

Results of RF power output : 716 W

The limit of the radiated emission at 300 m : $25 \times \sqrt{716/500} = 29.9$ [μV/m] = 29.5 [dB(μV/m)]

The AC power input to the oven is measured to determine if the oven is operating in accordance with the manufacturer's specifications.

Rated AC power input : 1700 W
Measured AC power input : AC 240 V, 6.71 A, 1561 W

Tester : Akio Hosoda

ISM Frequency Measurement ISM Frequency Device

Test Date: July 19, 2004
Temp.: 27 °C ; Humi.: 60 %

The maximum frequency deviation was measured at -26dB with respect to the maximum level.

Maximum Frequency Deviation [MHz]		Voltage Variation	Remarks
Lower Frequency	Upper Frequency		
2413.10	2468.80	192 V (80 %)	A
2411.60	2470.40	240 V (100 %)	A
2414.60	2470.60	300 V (125 %)	A

The point shown on “___” is the Minimum Margin Point.

The results were within 2450 MHz ± 50 MHz.

Remarks:

	Detector Function	RES. B.W.	V.B.W.	Sweep Time	Span
A	Peak	100 kHz	300 kHz	30 msec	100 MHz

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: July 25, 2004
Temp.: 27 °C, Humi: 56 %

Frequency [MHz]	Correction Factor [dB(1/m)]	Meter Readings at 3 m [dB(μV)]	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]	Margin [dB]	Remarks
0.15	0.1	< 30.0	29.5	< - 9.9	> +39.4	B
1.00	0.0	< 30.0	29.5	< -10.0	> +39.5	B
3.00	0.0	< 30.0	29.5	< -10.0	> +39.5	B
5.00	-0.2	37.0	29.5	- 3.2	+32.7	B
10.00	-0.3	< 30.0	29.5	< -10.3	> +39.8	B
25.00	1.1	31.0	29.5	- 7.9	+37.4	B

Sample of calculated result at 5.00 MHz, as the Minimum Margin point:

Corr. Factor	=	-0.2 dB(1/m)
Conversion Factor	=	-40.0 dB (20dB/decade)
+) Meter Reading	=	37.0 dB(μV)
Result	=	-3.2 dB(μV/m) at 300 m = 0.7 μV/m

Minimum Margin: 29.5 - (-3.2) = 32.7 (dB)

The point shown on " ____ " is the Minimum Margin Point.

Remarks:

	Detector Function	IF Bandwidth
A	Average	200 Hz
B	Average	10 kHz

Tester : _____ Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: July 25, 2004
 Temp.: 27 °C, Humi: 56 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)]		Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)]		Margin [dB]	Remarks
			Hori.	Vert.		Hori.	Vert.		
2399.3	21.5	10.8	27.0	27.0	29.5	19.3	19.3	+10.2	B
2501.0	21.2	10.8	26.0	26.0	29.5	18.0	18.0	+11.5	B
9820.0	39.2	-27.0	38.0	38.0	29.5	10.2	10.2	+19.3	B
12285.0	43.2	-26.2	33.0	33.4	29.5	10.0	10.4	+19.1	B
14710.0	45.6	-26.1	37.0	40.0	29.5	16.5	19.5	+10.0	B
17256.0	43.5	-26.5	36.0	42.7	29.5	13.0	19.7	+ 9.8	B
17273.0	43.5	-26.5	38.0	42.0	29.5	15.0	19.0	+10.5	B
19740.0	40.3	-17.3	< 37.0	< 37.0	29.5	< 20.0	< 20.0	> + 9.5	B
22208.0	40.3	-17.7	< 37.0	< 37.0	29.5	< 19.6	< 19.6	> + 9.9	B
24676.0	40.4	-18.9	< 37.0	< 37.0	29.5	< 18.5	< 18.5	> +11.0	B

Sample of calculated result at 19740.0 MHz, as the Minimum Margin point:

Antenna Factor = 40.3 dB(1/m)
 Corr. Factor = -17.3 dB
 Conversion Factor = -40.0 dB (20dB/decade)
 +) Meter Reading = <37.0 dB(μV)
 Result = <20.0 dB(μV/m) at 300 m = <10.0 μV/m

Minimum Margin: 29.5 - <20.0 = >9.5 (dB)

The point shown on " ____ " is the Minimum Margin Point.

Note: Corr. Factor = Cable Loss + 10dB Pad Att. [dB] (near the edge of ISM frequency 2450 MHz)
 = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
 = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
 = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain + Mixer Loss [dB] (18.0 - 26.0GHz)

Remarks:

	Detector Function	IF Bandwidth
A	Peak	1 MHz
B	Average	1 MHz

Tester : _____ Akio Hosoda