



JAPAN QUALITY ASSURANCE ORGANIZATION

SHIKATSU BRANCH, CHUBU Testing Center

53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasuga-gun, Aichi 481-0005 Japan

Phone. +81-568-23-0023 / Facsimile. +81-568-23-0116

Issue Date : April 01, 2005

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EMI TEST REPORT

JQA File No. : 50-40474

Model/Type No. : R-930CSF

Type of Equipment : Household Microwave Oven

Regulation applied : FCC Rules and Regulations Part 18

FCC ID : APYDMR0153

Applicant : Sharp Corporation, Reliability Control Group

Address : 22-22 Nagaike-Cho, Abeno-Ku,
Osaka 545-8522, Japan

Manufacturer : Sharp Appliances (Thailand) Ltd.

Address : 64 Moo 5, Tambol Bangsamuk, Amphur Bangpakong,
Chachoengsao, Province, Thailand

Received date of EUT : February 17, 2005

Final Judgment : Passed

TEST RESULT IN THIS REPORT are obtained in used of equipments that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.

THE TEST RESULTS only responds to the test sample.

THIS REPORT should not be reproduced, except in full, without the approval of the JQA Chubu Testing Center.



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1.1 GENERAL INFORMATION

1.1.1 Test Facility :

- 1) Test Facility located at Chubu Testing Center SHIKATSU Branch :
An anechoic Chamber (3 m and 10 m, on common plane) and a shielded Room
Date of Listing : September 11, 2002
FCC filing No.: 31040/SIT 1300F2
- 2) Chubu Testing Center SHIKATSU Branch 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 : 200190-0

1.1.2 Description of the Equipment Under Test :

- 1) Type of Equipment : Household Microwave Oven
- 2) Model/Type No. : R-930CSF
- 3) Type of Magnetron : 2M167B
- 4) Category : ISM Frequency Device
- 5) EUT Authorization : Certification
- 6) FCC ID : APYDMR0153
- 7) Product Type : Prototype
- 8) Serial No. : N/A
- 9) Date of manufacturer : February, 2005
- 10) Trade Name : SHARP
- 11) Fundamental Frequency : 4.0, 2450.0 MHz
Generated in the EUT
- 12) Highest Frequency : 2450.0 MHz
Used in the EUT
- 13) Power Rating : 120VAC 60Hz 1-Phase
- 14) Rated Power Output : 900 W
- 15) EUT Grounding : Grounded at the plug end of the power line cord.

1.1.3 Definitions for symbols used in this test report :

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

1.2 TEST REGULATION

FCC Rules and Regulations Part 18 Subpart A, B and C(October 1, 2002).

Test Procedure :

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



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1.3 TEST CONDITIONS

1.3.1 The measurement of the RF Power Output was performed in the following test site.

Test Location :

KITA KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, JAPAN

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Clamp on Power Meter	3167	HIOKI	08011116	Jun, 2004	1 Year
- Stop Watch	8N5502	SEIKO	Q47097355	July, 2004	1 Year
- Digital Thermometer	2455	YOKOGAWA	Q47097361	March, 2004	1 Year

Environmental Conditions :

Temperature: 29.0 Humidity: 60.0 %



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1.3.2 The measurement of the ISM Frequency

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

Test Location :

Chubu Testing Center SHIKATSU Branch
53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasugai-gun, Aichi 481-0005, JAPAN

- Anechoic Chamber No.2

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Spectrum Analyzer	8566B	Hewlett Packard	2937A06026	July, 2004	1 Year
- Horn Antenna	3160-03	EMCO	9911-1065	May, 2004	1 Year
- RF Cable	-	Hewlett Packard	A-2	May, 2004	1 Year

Environmental Conditions :

Temperature: 20.0 Humidity: 48.0 %

1.3.3 The measurement of the AC Power Line Conducted Emission
was performed in the following test site.**Test Location :**

Chubu Testing Center SHIKATSU Branch
53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasugai-gun, Aichi 481-0005, JAPAN

- Anechoic Chamber No.1
- Shielded Room

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Field Strength Meter	ESH 2	Rohde & Schwarz	864125/007	May, 2004	1 Year
- LISN(for EUT)	KNW-407	Kyoritsu Electrical	8-901-20	Jun, 2004	1 Year
- RF Cable	3D-2W	Fujikura	S-A	May, 2004	1 Year
- RF Cable	3D-2W	Fujikura	S-B	May, 2004	1 Year
- 50ohm Termination	CT01	TME	No.1	May, 2004	1 Year

Environmental Conditions :

Temperature: 20.0 Humidity: 34.0 %

1.3.4 The measurement of the Radiated Emission(Magnetic Field)

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

Test Location :

Chubu Testing Center SHIKATSU Branch
53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasugai-gun, Aichi 481-0005, JAPAN

- Anechoic Chamber No.1

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Field Strength Meter	ESH 2	Rohde & Schwarz	864125/007	May, 2004	1 Year
- Loop Antenna	6502	EMCO	8811-2249	April, 2004	1 Year
- RF Cable	3D-2W	Fujikura	S-A	May, 2004	1 Year

Environmental Conditions :

Temperature: 20.0 Humidity: 40.0 %

1.3.5 The measurement of the Radiated Emission(Electric Field)

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

Test Location :

Chubu Testing Center SHIKATSU Branch
53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasugai-gun, Aichi 481-0005, JAPAN

- Anechoic Chamber No.1 (3 meters)
- Anechoic Chamber No.1 (10 meters)

Validation of Site Attenuation :

- 1) Last Confirmed Date : May 04, 2004
- 2) Interval : 1 Year

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Field Strength Meter	ESCS30	Rohde & Schwarz	130201095	March, 2004	1 Year
- Biconical Antenna	BBA9106	Schwarzbeck	ANT-5-004	August, 2004	1 Year
- Log-periodic Antenna	UHALP9107	Schwarzbeck	ANT-5-002	August, 2004	1 Year
- RF Cable	5D-2W	Fujikura	A-3	May, 2004	1 Year
- RF Cable	106-02	SUHNER	A-10-2	May, 2004	1 Year

Environmental Conditions :

Temperature: 20.0 Humidity: 40.0 %

1.3.6 The measurement of the Radiated Emission(Electric Field)

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

Test Location :

Frequency Range:1GHz - 18GHz

Chubu Testing Center SHIKATSU Branch

53-1, Yamaura, Yakushiji, Shikatsu-cho, Nishikasugai-gun, Aichi 481-0005, JAPAN

- Anechoic Chamber No.2

Frequency Range:18Hz - 26GHz

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Mino-shi, Osaka 562-0072, JAPAN

- Anechoic Chamber

Used Test Instruments :

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
- Spectrum Analyzer	8566B	Hewlett Packard	2937A06026	July, 2004	1 Year
- Spectrum Analyzer	E4446A	Agilent Technologies	US4430038	October, 2004	1 Year
- Horn Antenna	3160-01	EMCO	9908-1032	May, 2004	1 Year
- Horn Antenna	3160-02	EMCO	9901-1047	May, 2004	1 Year
- Horn Antenna	3160-03	EMCO	9911-1065	May, 2004	1 Year
- Horn Antenna	3160-04	EMCO	9911-1059	May, 2004	1 Year
- Horn Antenna	3160-05	EMCO	9911-1073	May, 2004	1 Year
- Horn Antenna	3160-06	EMCO	9910-1051	May, 2004	1 Year
- Horn Antenna	3160-07	EMCO	9911-1123	May, 2004	1 Year
- Horn Antenna	3160-08	EMCO	9912-1036	May, 2004	1 Year
- Horn Antenna	3160-09	EMCO	9808-1117	December, 2003	2 Year
- Attenuator	8493C	Hewlett Packard	2708A07046	December, 2004	1 Year
- Attenuator	54-10	Lucas Weinschel	E6164	November, 2004	1 Year
- Attenuator	54-10	Lucas Weinschel	C8599	November, 2004	1 Year
- PR AMP	DWT-12013	DBS Microwave	003	September, 2004	1 Year
- PR AMP	DWT-18037	DBS Microwave	006	September, 2004	1 Year
- PR AMP	ALN-22093545-1	Wise Wave	10939-01R	February, 2005	1 Year
- RF Cable	SUCOFLEX102	HUBER+SUHNER	14445/2	February, 2005	1 Year
- RF Cable	-	Hewlett Packard	A-0.5	May, 2004	1 Year
- RF Cable	-	Hewlett Packard	A-2	May, 2004	1 Year

Environmental Conditions :

Chubu Testing Center SHIKATSU Branch
 Temperature: 20.0 Humidity: 48.0 %

KITA-KANSAI Testing Center
 Temperature: 19.0 Humidity: 31.0 %



1.4 EUT Modification / Deviation of Test Method

EUT Modification :

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

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

Applicant : N/A

Date :

Type Name :

Position :

RESPONSIBLE PARTY

Responsible Party of Test Item(Product)

Responsible party : N/A

Contact Person :

Signatory

Deviation of Test Method :

- No deviations from the test method.
- It was employed the with following deviations from the test method.



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1.5 TEST RESULTS

RF Power Output

Measurement Results (Calorimetric method) 668.4 W

Applied Limits of Radiated Emission 28.9 uV/m at 300 m
10.0 uV/m at 1600 m

Remarks : _____

ISM Frequency 2.4 GHz - 2.5 GHz

The requirements are - PASSED - NOT PASSED

Worst(lowest/highest)range 2413.6 MHz - 2469.8 MHz
Against 2450 MHz \pm 50 MHz

Remarks : _____

AC Power Line Conducted Emissions 150 kHz - 30 MHz

The requirements are - PASSED - NOT PASSED

Minimum limit margin 19.7 dB at 0.15 MHz

Maximum limit exceeding dB at MHz

Uncertainty of measurement results +2.3 dB(2) -2.3 dB(2)

Remarks : _____

Radiated Emissions (Magnetic Field) 9 KHz - 30 MHz

The requirements are	- PASSED	- NOT PASSED
Minimum limit margin	- dB at	- MHz
Maximum limit exceeding	dB at	MHz
Uncertainty of measurement results	+2.9 dB(2)	-2.9 dB(2)

Remarks : The spectrum was scanned from 9 KHz to 30 MHz and all emissions were found to be less than the maximum sensitivity of used test instrument.

Radiated Emissions (Electric Field) 30 MHz - 1000 MHz

The requirements are	- PASSED	- NOT PASSED
Minimum limit margin	55.9 dB at	132.0 MHz
Antenna height Position	1.0 m	
EUT Position (CCW)	80 degree	
Maximum limit exceeding	dB at	MHz
Uncertainty of measurement results	+3.3 dB(2)	-3.3 dB(2)

Remarks : _____

Radiated Emissions (Electric Field) 1 GHz - 24.5 GHz

The requirements are	- PASSED	- NOT PASSED
Minimum limit margin	4.1 dB at	19724.0 MHz
EUT Position (CCW)	0 degree	
Maximum limit exceeding	dB at	MHz
Uncertainty of measurement results	+2.6 dB(2)	-2.6 dB(2)

Remarks : _____

1.6 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, 2002) under the test configuration, as shown in page 15 and 16.

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

FINAL JUDGMENT :

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 : February 17, 2005

End of testing : March 15, 2005

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved Signatory :

Approved by:

Issued by:



Yatsuhiko Onomatsu
Manager
EMC Div. SHIKATSU Branch
JQA Chubu Testing Center



Shinichi Yokoi
Assistant Manager
EMC Div. SHIKATSU Branch
JQA Chubu Testing Center

1.7 CONFIGURATION OF EUT / OPERATION OF EUT**1.7.1 Test Configuration****The Equipment Under Test (EUT) consists of :**

Description	Manufacturer	Model No.	FCC ID	Serial No.
Household Microwave Oven	Sharp Appliances (Thailand) Ltd.	R-930CSF	APYDMR0153	N/A

The measurement was carried out with the following equipment connected :

None

1.7.2 Port description of the interconnecting cable of the EUT

None

1.7.3 Operation of the EUT :

Power Supply Voltage : 120VAC 60Hz 1-Phase

Operating mode :

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

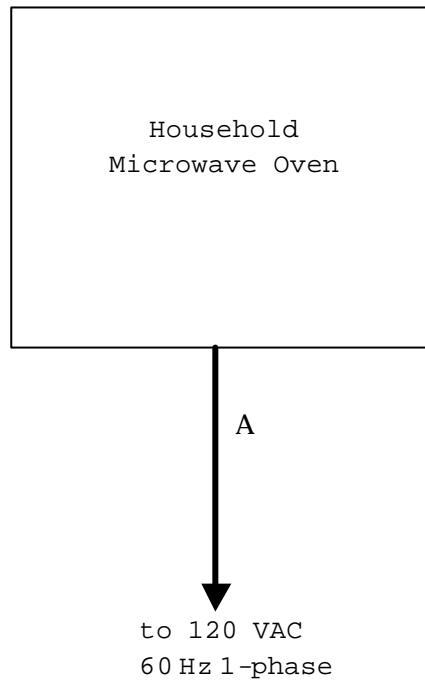
- 1) RF Power Output Measurement
1000 ml of water, with the beaker located in the center of the removable turntable.
- 2) ISM Frequency Measurement
1000 ml of water, with the beaker located in the center of the removable turntable.
- 3) Conducted Emissions Measurement
1000 ml of water, with the beaker located in the center of the removable turntable.
- 4) 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 removable turntable and with it in the right front center.
- 5) Radiated Emission Measurement(all other radiation)
700 ml of water, with the beaker located in the center of the removable turntable.

Type of Magnetron : 2M167B by Matsushita

1.7.4 The generated and operating frequency in the EUT :

4.0, 2450.0 MHz

1.7.5 EUT arrangement :



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

Cable No.	Description	Shielded	Ferrite core	Length	Connector
A	AC power cable	No	No	1.1 m	Non-metallic

1.8 PRELIMINARY TEST and TEST SET-UP (Drawing and Photograph)

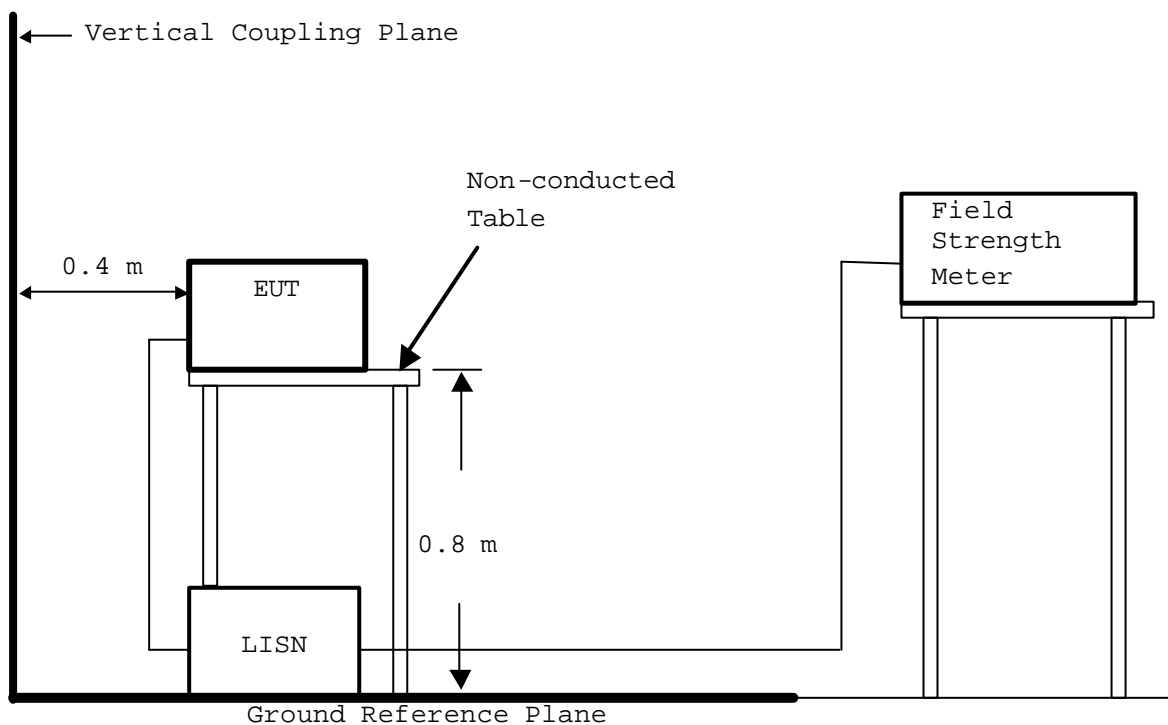
AC Power Line Conducted Emissions 150 kHz - 30 MHz :

According to description of CISPR11, The AC Power Line preliminary conducted emissions measurement were carried out.

The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

Shielded Enclosure



Magnetic Field Radiation Emissions 9 kHz - 30 MHz :

The preliminary test was performed according to the description of FCC/OET MP-5(1986) Sec.5.1 (Preliminary Radiated Emissions Test) and Sec.5.2 (Equipment Configurations).

The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration.

In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

Step 2: In order to investigate the frequencies of maximum emissions, the loop antenna position was approached to the EUT and the significant frequency of the emission's circumstance from the test system were investigated.

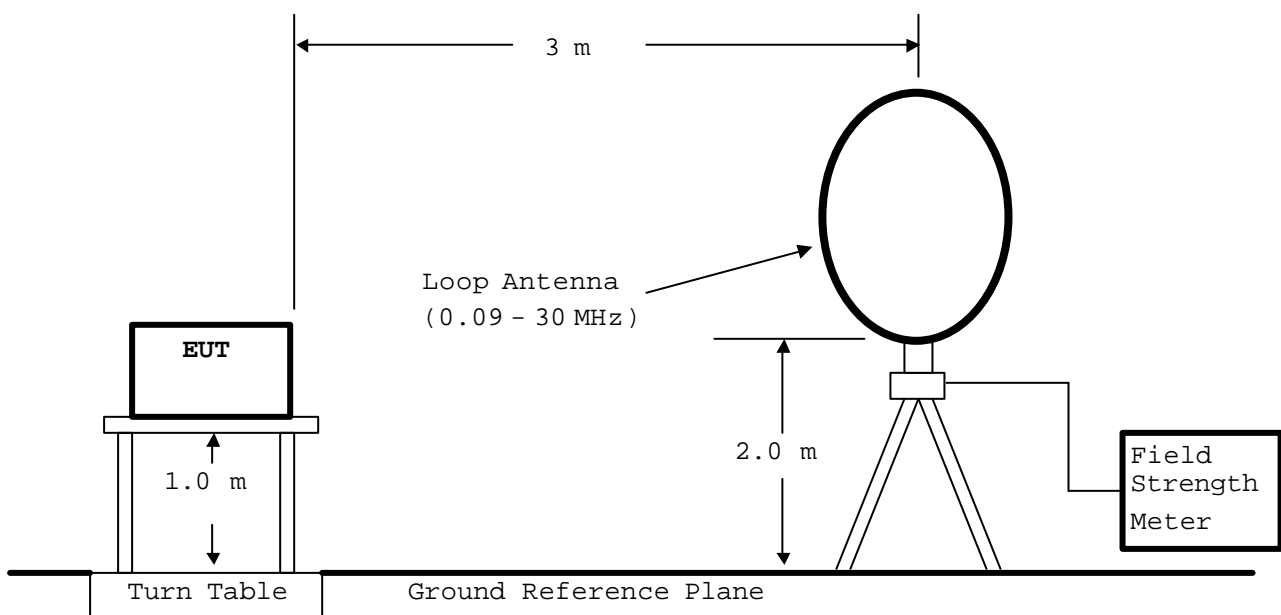
These data were recorded in the specified frequency band (9 kHz - 30 MHz).

Step 3: Using a test receiver and a loop antenna, the emissions' circumstance from the test system was measured in accordance with FCC/OET MP-5(1986) Sec.5.6 (Final Radiated Emissions Test) at each frequency which was found the higher emission referred to level vs. frequency on the list and which was measured by the loop antenna.

Step 4: Return to step 1, if the other operation mode was possible to be setting.

Step 5: The worst result was reported arranging data of which was obtained and performed by one or plural operation modes as the final test. At the worst point that the highest amplitude relative to the limit the repeatability of the level was reconfirmed. The photographs of the test system setup worst point were taken and recorded.

Anechoic Chamber



Radiated Emissions 30 MHz - 1000 MHz :

The preliminary test was performed according to the description of FCC/OET MP-5(1986) Sec.5.1 (Preliminary Radiated Emissions Test) and Sec.5.2 (Equipment Configurations).

The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration.

In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

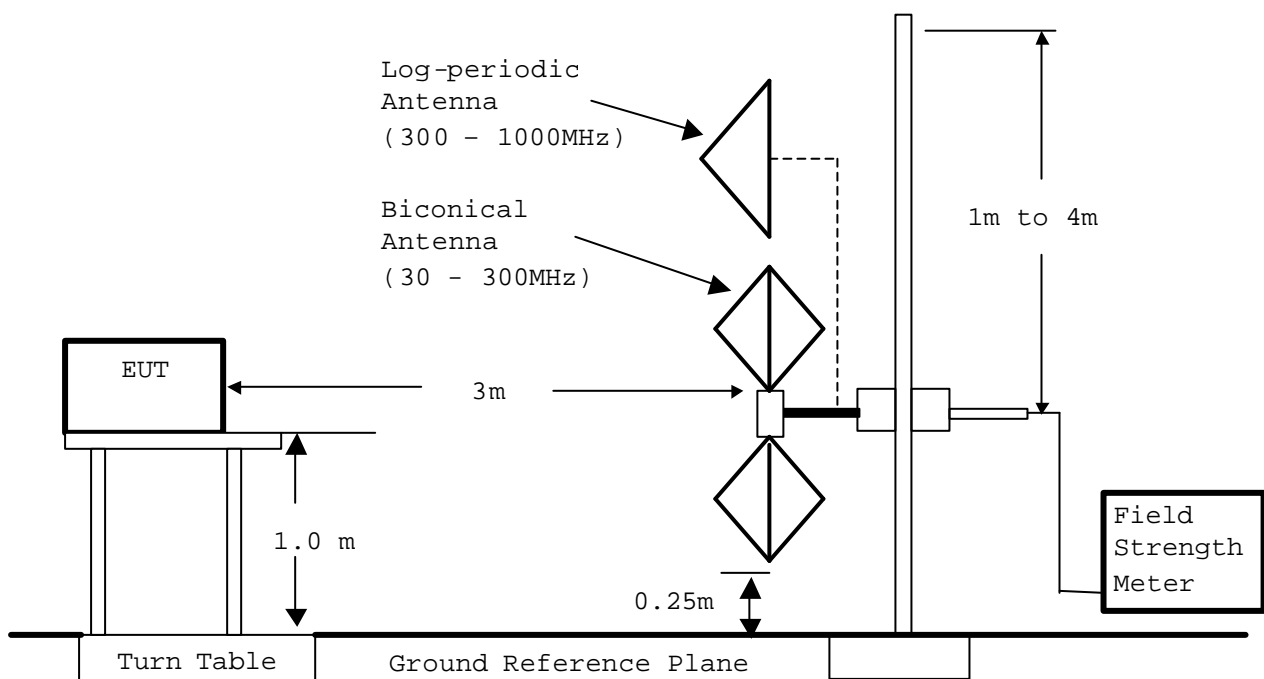
Step 2: Using a test receiver and a test antenna probe, the significant frequency of the emission's circumstance from the test system were investigated. These data were recorded every one to 22 divided bands in the specified frequency band (30 MHz - 1000 MHz).

Step 3: Using a test receiver and a resonant tuned dipole antenna, the emission's Circumstance from the test system was measured in accordance with FCC/OET MP-5(1986) Sec.5.6 (Final Radiated Emissions Tests) at each frequency which was found the higher emission referred to level vs. frequency on the list and which was measured by the resonant tuned dipole antenna.

Step 4: Return to step 1, if the other operation mode was possible to be setting.

Step 5: The worst result was reported arranging data of which was obtained and performed by one or plural operation modes as the final test.

Anechoic Chamber



Radiated Emissions 1.0 GHz - 24.5 GHz :

The preliminary test was performed according to the description of FCC/OET MP-5(1986) Sec.5.1(Preliminary Radiated Emissions Test) and Sec.5.2(Equipment

Configurations). The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration.

In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

Step 2: In order to investigate the frequencies of maximum emissions, the horn antenna position was approached to the EUT and the significant frequency of the emission's circumstance from the test system were investigated.

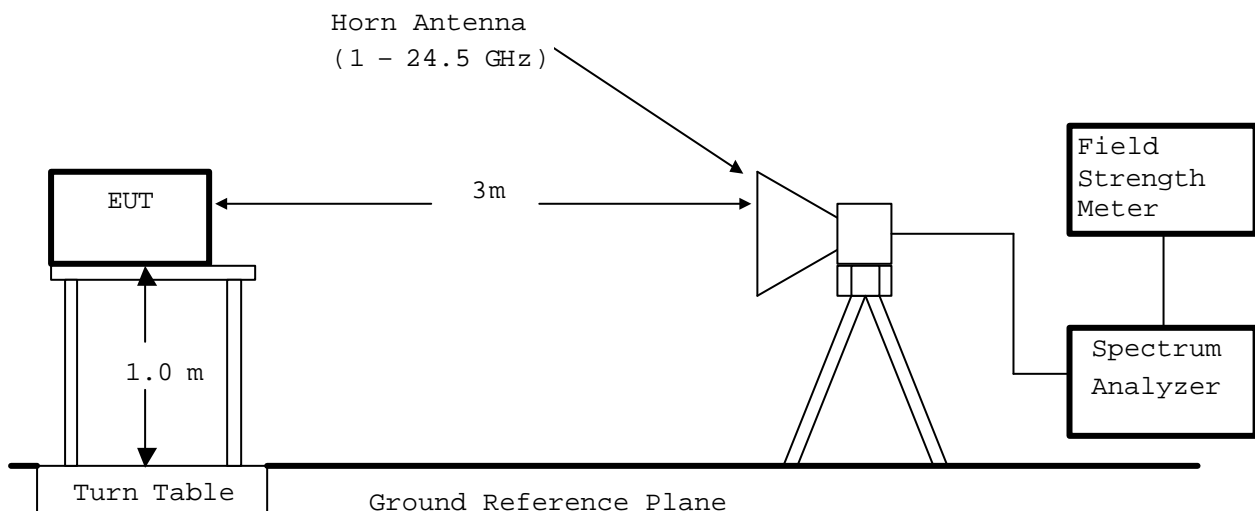
These data were recorded in the specified frequency band(1 GHz - 24.5 GHz).

Step 3: The emissions' circumstance from the test system was measured in according with FCC/OET MP-5(1986) Sec.5.6 (Final Radiated Emissions Test) at each frequency which was found the higher emission referred to level vs. frequency on the list and which was measured in the specified distance using the horn antenna.

Step 4: Return to step 1, if the other operation mode was possible to be setting.

Step 5: The worst result was reported arranging data of which was obtained and performed by one or plural operation modes as the final test. At the worst point that the highest amplitude relative to the limit the repeatability of the level was reconfirmed. The photographs of the test system setup worst point were taken and recorded.

Anechoic Chamber



TEST SET-UP (Photograph)

Conducted Emissions

- Front View -



- Side View -



Radiated Emissions

- Front View -



- Rear View -



2. TEST DATA

2.1 RF Power Output Measurement

Date : February 17, 2005
 Temp.: 29.0 °C Humi.: 60.0 %

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 : 47.0 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	10.0	17.6	679.1
2	10.4	17.8	661.3
3	9.7	17.3	679.1
4	9.8	17.2	661.3
5	9.5	16.9	661.3
Average			668.4

$$*) \text{RF Power Output [W]} = 4.2 \times 1000 \times (t_2 - t_1) / 47.0$$

Results of RF power output : 668.4 W

The limit of the radiated emission at 300m : $25 \times \sqrt{668.4/500} = 28.9 (\mu\text{V/m})$

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 : AC 120 V × 13.0 A = 1560 VA

Measured AC power input: AC 120 V × 12.9 A = 1568 VA

Tested by : 
 Yatsuhiko Onomatsu

2.2 ISM Frequency Measurement

Date : March 15, 2005
 Temp. : 20.0 °C Humi.: 48.0 %

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

Maximum Frequency Deviation [MHz]		Voltage
Lower Frequency	Upper Frequency	Variation
2413.6	2469.7	96.0 V (80%)
2421.2	2469.6	120.0 V (100%)
2436.6	2469.8	150.0 V (125%)

Remarks: Setup of Spectrum Analyzer
 Detector Function : Peak
 Resolution Bandwidth : 10 KHz
 Video Bandwidth : 10 KHz
 Sweep Time : 20 ms
 Span : 100 MHz

Tested by : 
 Yatsuhiko Onomatsu

2.3 AC Power Line Conducted Emissions 150 kHz - 30 MHz

Date : March 8, 2005
 Temp : 20°C Humi : 34%

Frequency MHz	Correction Factor dB	Meter Reading				Limits		Results		Margins	
		VA-QP	VA-AV	VB-QP	VB-AV	QP	AV	QP	AV	QP	AV

Notes:

- 1) Test Location : Shielded Room
- 2) The spectrum was checked from 0.15MHz to 30MHz
- 3) The symbol of "<" means "or less".
- 4) The symbol of "-" means "Not applicable".
- 5) The correction factor contains the LISN factor and the cable(2.0m length) loss.
- 6) A sample calculation was made at 0.15 MHz
 Correction Factor + Meter Reading
 0.3 + 46.0 = 46.3 dB(μV)
- 7) Setting of the measuring instrument :
 - a) Detector Function : CISPR Quasi-Peak
 IF Bandwidth : 9kHz
 - b) Detector Function : Average
 IF Bandwidth : 10kHz

Tested by :


 Yatsuhiko Onomatsu

2.4 Magnetic Field Radiated Emissions Measurement 9 kHz - 30 MHz

Date : March 13, 2005
 Temp. : 20.0 °C Humi. : 40.0 %

Frequency (MHz)	Correction Factor (dB)	Meter Reading at 3m (dB/V/m)	Limits		Result		Margin (dB)
			300m	1600m	300m	1600m	
			(uV/m)		(uV/m)		
0.01	19.7	<40.0	28.9	10.0	<0.10	<0.0034	-
0.10	10.8	<40.0	28.9	10.0	<0.03	<0.0012	-
0.15	10.7	<40.0	28.9	10.0	<0.03	<0.0012	-
1.00	10.4	<40.0	28.9	10.0	<0.03	<0.0012	-
5.00	10.8	<40.0	28.9	10.0	<0.03	<0.0012	-
10.00	10.3	<40.0	28.9	10.0	<0.03	<0.0012	-
20.00	9.8	<40.0	28.9	10.0	<0.03	<0.0012	-
30.00	8.1	<40.0	28.9	10.0	<0.03	<0.0012	-

- Notes : 1) Test Location : Anechoic Chamber No.1
 2) Distance measurement : 3m
 3) The spectrum was checked from 9 KHz to 30 MHz.
 4) The symbol of "<" means "or less".
 5) The correction factor contains the antenna factor and the cable(2.0m) loss.
 6) A sample calculation was mad at 0.01 MHz.

Correction Factor = 19.7 (dB)
 Conversion Factor = -80.0 (dB) [40dB/decade]
 Meter Reading = 40.0 (dB/uV)

Result = -20.3 (dB/uV/m) = 0.1 (uV/m)

- 7) Setting of measurement instrument
 Detector Function : Average
 IF Bandwidth : 10 KHz - 150 KHz : 200 Hz
 150 KHz - 30 MHz : 10 kHz

Tested by :


 Yatsuhiko Onomatsu

2.5 Electromagnetic Field Radiated Emissions Measurement 30 MHz - 1000 MHz

Date : March 13, 2004
 Temp.: 20.0 °C Humi.: 40.0 %

Frequency (MHz)	Correction Factor (dB)	Meter Reading at 3m (dB/V/m)		Limits		Result(Highest)		Margin (dB)
		Hori.	Vert.	300m (uV/m)	1600m	300m (uV/m)	1600m	
30.0	18.9	<-6.0	<-6.0	28.9	10.0	<0.044	<0.008	-
70.0	7.1	<-6.0	<-6.0	28.9	10.0	<0.011	<0.002	-
100.0	10.8	<-6.0	<-6.0	28.9	10.0	<0.017	<0.003	-
132.0	14.3	-1.0	-4.0	28.9	10.0	0.046	0.009	55.9
142.0	15.1	-3.0	<-6.0	28.9	10.0	0.040	0.008	57.1
200.0	19.7	<-6.0	<-6.0	28.9	10.0	<0.048	<0.009	-
300.0	22.1	<-6.0	<-6.0	28.9	10.0	<0.064	<0.012	-
500.0	23.4	<-6.0	<-6.0	28.9	10.0	<0.074	<0.014	-
700.0	26.5	<-6.0	<-6.0	28.9	10.0	<0.106	<0.020	-
1000.0	31.1	<-6.0	<-6.0	28.9	10.0	<0.180	<0.034	-

- Notes : 1) Test Location : Anechoic Chamber No.1
 2) Distance measurement : 3m
 3) The spectrum was checked from 30 to 1000 MHz.
 4) The symbol of "<" means "or less".
 5) The correction factor contains the antenna factor and the cable(22.0 m) loss.
 6) A sample calculation was mad at **132.0** MHz.

Correction Factor = 14.3 (dB)
 Conversion Factor = -40.0 (dB) [20dB/decade]
 Meter Reading = -1.0 (dB/uV)

Result = -26.7 (dB/uV/m) = 0.046 (uV/m)

- 7) Setting of measurement instrument
 Detector Function : Average
 IF Bandwidth : 120 KHz

Tested by :


 Yatsuhiko Onomatsu

2.6 Electromagnetic Field Radiated Emissions Measurement 1 GHz - 24.5 GHz

Date : March 15, 2005
 Temp. : 20.0 °C Humi. : 48.0 %

Frequency (MHz)	Correction Factor (dB)	Meter Reading at 3m (dB/V/m)		Limits		Result (Highest)		Margin (dB)
		Hori.	Vert.	300m (uV/m)	1600m	300m (uV/m)	1600m	
2400.0	22.6	<40.0	<40.0	28.9	10.0	<13.49	<2.53	-
2500.0	22.6	<40.0	<40.0	28.9	10.0	<13.49	<2.53	-
4386.4	-16.3	72.0	70.4	28.9	10.0	6.10	1.14	13.5
4933.2	-16.0	70.4	66.8	28.9	10.0	5.25	0.98	14.8
7390.1	-12.6	72.8	69.6	28.9	10.0	10.23	1.92	9.0
8107.6	-12.5	60.4	60.9	28.9	10.0	2.63	0.49	20.8
9829.6	-7.3	64.1	62.4	28.9	10.0	6.92	1.30	12.4
12289.1	-5.8	57.9	52.4	28.9	10.0	4.03	0.76	17.1
14773.5	-2.0	54.4	48.8	28.9	10.0	4.17	0.78	16.8
17254.6	0.2	54.0	52.9	28.9	10.0	5.13	0.96	15.0

Date : February 25, 2005
 Temp. : 19.0 °C Humi. : 31.0 %

Frequency (MHz)	Correction Factor (dB)	Meter Reading at 3m (dB/V/m)		Limits		Result (Highest)		Margin (dB)
		Hori.	Vert.	300m (uV/m)	1600m	300m (uV/m)	1600m	
19724.0	9.5	55.6	45.6	28.9	10.0	17.99	3.37	4.1
22171.0	9.8	41.6	43.6	28.9	10.0	4.68	0.88	15.8
24638.0	8.6	45.6	47.6	28.9	10.0	7.24	1.36	12.0

- Notes : 1) Test Location : Chubu Testing Center SHIKATSU Branch Anechoic Chamber No.2
 KITA-KANSAI Testing Center Anechoic Chamber
 2) Distance measurement : 3m
 3) The spectrum was checked from 1 to 24.5 GHz.
 4) The symbol of "<" means "or less".
 5) The correction factor contains the antenna factor , cable(2.5 m) loss, and AMP gain.
 6) A sample calculation was mad at 19724.0 MHz.
 Correction Factor = 9.5 (dB)
 Conversion Factor = -40.0 (dB) [20dB/decade]
 Meter Reading = 55.6 (dB/uV)
 Result = 25.1 (dB/uV/m) = 17.99 (uV/m)

- 7) Setting of measurement instrument
 Spectrum Analyzer
 Detector Function : Peak Average
 Resolution Bandwidth : 1 MHz 3 MHz
 Video Bandwidth : 1 MHz 3 MHz
 Span : 0 Hz 0 Hz
 Field Strength Meter *)
 SCALE : LINER
 Detector Function : Average
 IF Bandwidth : 1 MHz

*) For the average measurement method, it is made measurement using a test receiver and spectrum analyzer.

Tested by :


 Yatsuhiko Onomatsu