JAPAN QUALITY ASSURANCE ORGANIZATION
KITA-KANSAI TESTING CENTER
7-7, Ishimaru 1-Chome, Minoh-shi, Osaka 562-0027 Japan. Phone. +81-72-729-2243/Facsimile. +81-72-728-6848

EMC EMISSION - TEST REPORT

JQA APPLICATION No. : KL80050090R

Name of Product : Microwave Oven

Model/Type No. : R-24GT-F

FCC ID : APYDMR0165

Applicant : Sharp Corporation, Kitchen Appliances Systems Div.

Address : 3-1-72 Kitakamei-Cho, Yao, Osaka 581-8585, Japan

Manufacturer : Sharp Corporation, Kitchen Appliances Systems Div.

Address : 3-1-72 Kitakamei-Cho, Yao, Osaka 581-8585, Japan

Receive date of EUT : April 25, 2005

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:

Yuichi Fukumoto, Manager
JQA KITA-KANSAI Testing Center

DIRECTORY

TEST REGULATION

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

● - Miscellaneous equipment
○ - Medical diathermy

● - ISM Frequency Device
○ - Non-ISM Frequency Device

○ - Industrial heaters and RF stabilized arc welder
○ - Induction cooking ranges

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	:	Microwave Oven
1) Model/Type No.	:	R-24GT-F
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	:	1800 W
9) Power Rating	:	AC 208/230V 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, 2005	1 Year
● - SIII-5000	Q47097350	February, 2005	1 Year

Environmental conditions:

Temperature: 28 °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		
○ - 8593A	A - 15		
● - E4446A	A - 39	October, 2004	1 Year
○ - 4T-10	D - 73		
○ - 4T-10	D - 74		
○ - WJ-6611-513	A - 23		
○ - WJ-6882-824	A - 21		
○ - DBL-0618N515	A - 33		
○ - 91888-2	C - 41 - 1		
● - 91889-2	C - 41 - 2	May, 2004	1 Year
○ - 94613-1	C - 41 - 3		
○ - 91891-2	C - 41 - 4		
○ - 94614-1	C - 41 - 5		
● - 2-10	D - 40	June, 2004	1 Year
● - TR5212	B - 30	March, 2005	1 Year
● - Cable	C - 40 - 8	May, 2004	1 Year
○ - Cable	C - 40 - 11		
○ - Cable	C - 40 - 12		

Environmental conditions:

Temperature: 19 °C Humidity: 78 % (Date : May 23, 2005)
Temperature: 24 °C Humidity: 40 % (Date : May 24, 2005)

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	September, 2004	1 Year
○ - ESH 2	A - 2		
○ - ESH 2	A - 3		
○ - KNW-407	D - 6		
● - KNW-408	D - 11	February, 2005	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, 2004	1 Year

Environmental conditions:

Temperature: 23 °C Humidity: 58 %

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, 2004	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: 24 °C Humidity: 68 %

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, 2004	1 Year
● - UHALP9108-A1	C - 28	August, 2004	1 Year
● - Cable	H - 2	August, 2004	1 Year

Environmental conditions:

Temperature: 17 °C Humidity: 43 %

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, 2004	1 Year
○ - ESCS 30	A - 9		
○ - 8566B	A - 13		
● - E4446A	A - 39	October, 2004	1 Year
● - 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
● - ALN-22093545-1	A - 37	February, 2005	1 Year
● - 91888-2	C - 41 - 1	May, 2004	1 Year
● - 91889-2	C - 41 - 2	May, 2004	1 Year
● - 94613-1	C - 41 - 3	May, 2004	1 Year
● - 91891-2	C - 41 - 4	May, 2004	1 Year
● - 94614-1	C - 40 - 5	May, 2004	1 Year
● - 3160-09	C - 48	December, 2003	2 Years
● - Cable	C - 40 - 11	May, 2004	1 Year
● - Cable	C - 40 - 12	May, 2004	1 Year
● - Cable	C - 53	February, 2005	1 Year
● - Cable	C - 54	February, 2005	1 Year

Environmental conditions:

Temperature: 19 °C Humidity: 78 % (Date : May 23, 2005)
Temperature: 24 °C Humidity: 40 % (Date : May 24, 2005)

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
Microwave Oven	Sharp Corporation (Sharp Corporation)	R-24GT-F (--)	APYDMR0165

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) 1ϕ 3-pin Plug	--	NO	--	NO	1.4 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
2000 ml of water, with the beaker located in the center of the food container.

2) ISM Frequency Measurement
2000 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 1400 ml and the other of 600 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)
1400 ml of water, with the beaker located in the center of the food container.

Test system:

The EUT is an microwave oven
There is not any interface ports on the EUT.

Special accessories:

None

Type of Magnetron:

Cat. No. 2M281H(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

Supply Voltage : 208VAC 60Hz

RF Power Output

Measurement Results (Calorimetric method) 1783.7 W

Applied Limits of Radiated Emission 47.2 µV/m at 300 m
10.0 µV/m at 1600 m

Remarks:

ISM Frequency 2.4 GHz - 2.5 GHz

The requirements are ● - Passed ○ - Not Passed

Worst (lowest/highest) range against 2.45 GHz ± 50 MHz 2415.7 MHz - 2476.6 MHz

Uncertainty of measurement results ± 100 kHz

Remarks:

AC Powerline Conducted Emission 150 kHz - 30 MHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin 18.8 dB at 2.50 MHz

Max. limit exceeding _____ dB at _____ MHz

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

Remarks:

Magnetic Field Radiated Emission 9 kHz - 30 MHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin	More than	31.1	dB	at	0.01	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 2.5	dB(2σ)		- 2.5	dB(2σ)

Remarks:

Electromagnetic Field Radiated Emission 30 MHz - 1000 MHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin	More than	36.9	dB	at	903.0	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 3.8	dB(2σ)		- 3.9	dB(2σ)

Remarks:

Electromagnetic Field Radiated Emission 1 GHz - 26 GHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin		9.2	dB	at	2397.0	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 3.2	dB(2σ)		- 3.2	dB(2σ)

Remarks:

Supply Voltage : 230VAC 60Hz

RF Power Output

Measurement Results (Calorimetric method)				1817.6	W
Applied Limits of Radiated Emission	47.7	µV/m	at	300	m
	10.0	µV/m	at	1600	m

Remarks: _____

ISM Frequency 2.4 GHz - 2.5 GHz

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

Worst (lowest/highest) range against 2.45 GHz ± 50 MHz	2410.7	MHz	-	2479.3 MHz
Uncertainty of measurement results				± 100 kHz

Remarks: _____

AC Powerline Conducted Emission 150 kHz - 30 MHz

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

Min. limit margin	17.8	dB	at	2.50 MHz
Max. limit exceeding	_____	dB	at	_____ MHz
Uncertainty of measurement results	+ 2.1	dB(2σ)		- 2.1 dB(2σ)

Remarks: _____

Magnetic Field Radiated Emission 9 kHz - 30 MHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin	More than	31.2	dB	at	0.01	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 2.5	dB(2σ)		- 2.5	dB(2σ)

Remarks:

Electromagnetic Field Radiated Emission 30 MHz - 1000 MHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin	More than	37.0	dB	at	903.0	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 3.8	dB(2σ)		- 3.9	dB(2σ)

Remarks:

Electromagnetic Field Radiated Emission 1 GHz - 26 GHz

The requirements are ● - Passed ○ - Not Passed

Min. limit margin		4.3	dB	at	2929.7	MHz
Max. limit exceeding			dB	at		MHz
Uncertainty of measurement results		+ 3.2	dB(2σ)		- 3.2	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 18.

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 : May 11 2005

End of testing : May 24, 2005

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved by :

A. Hosoda

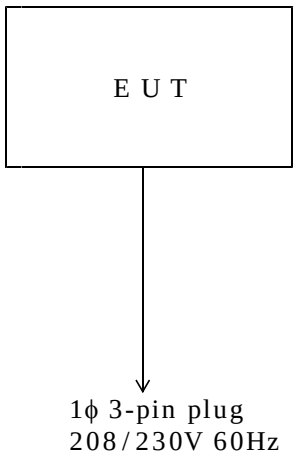
Akio Hosoda
Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Issued by :

S. Kino

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

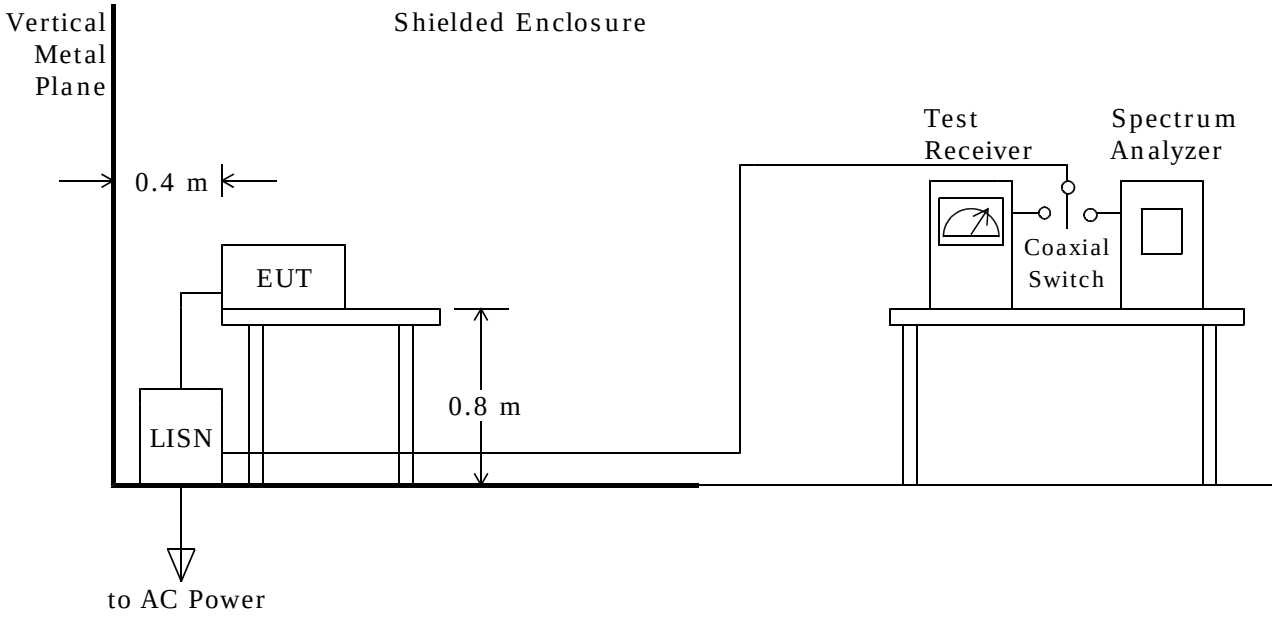
Test System-Arrangement (Drawings)



Test-setup(Drawings)

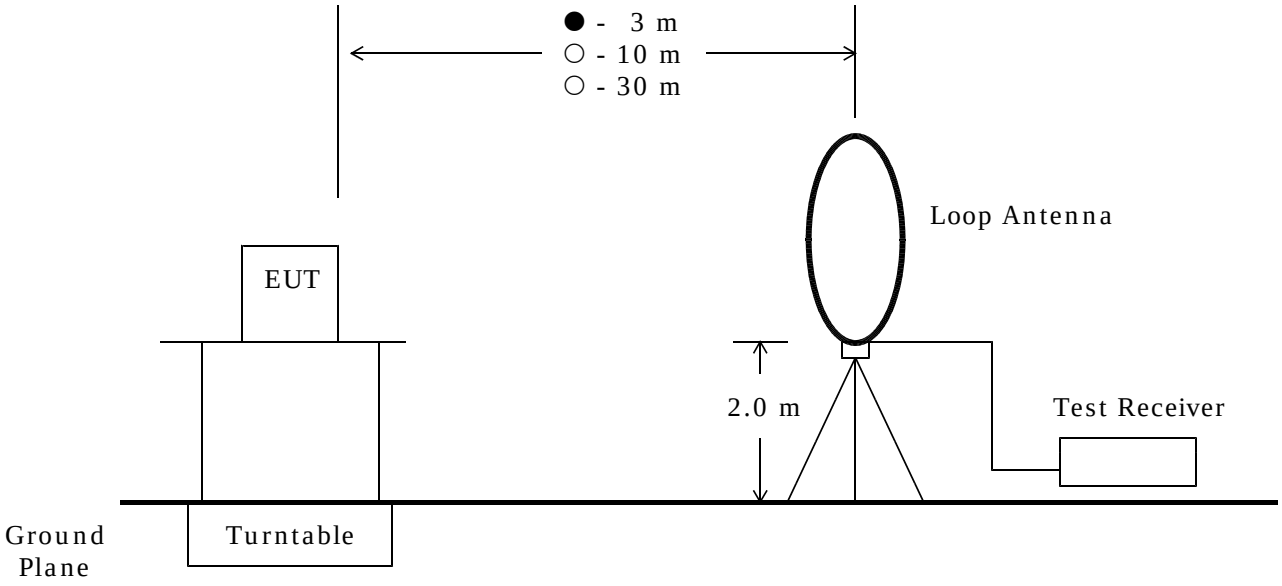
Conducted Disturbance 150 kHz - 30 MHz:

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



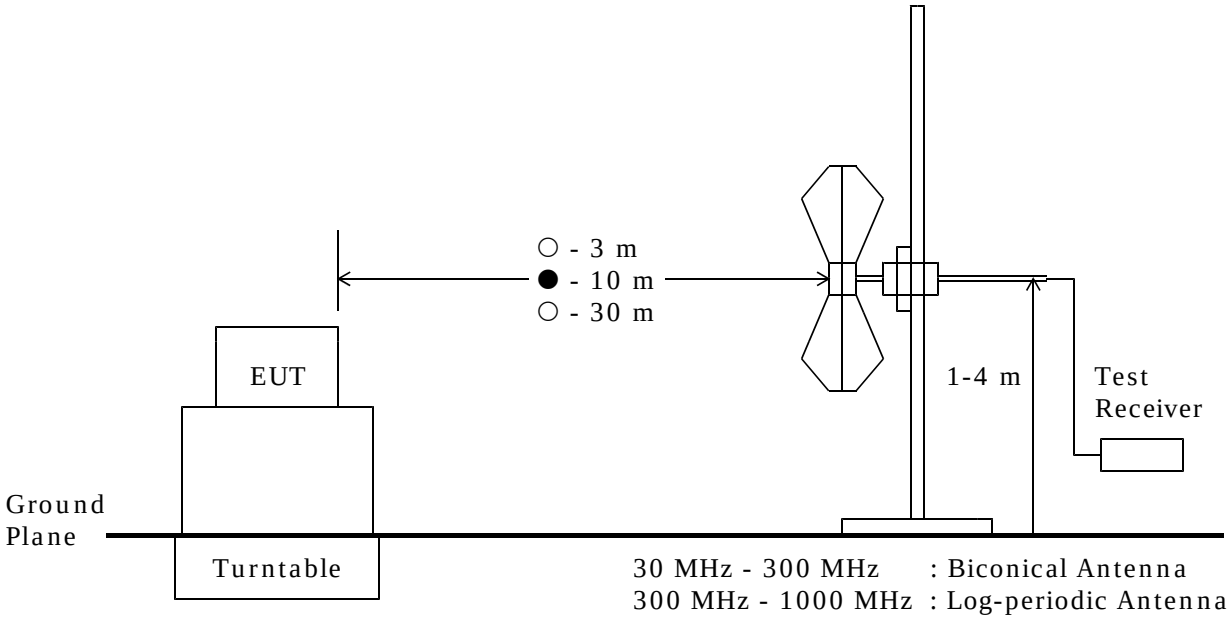
Magnetic Field Radiated Emission 9 kHz - 30 MHz:

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



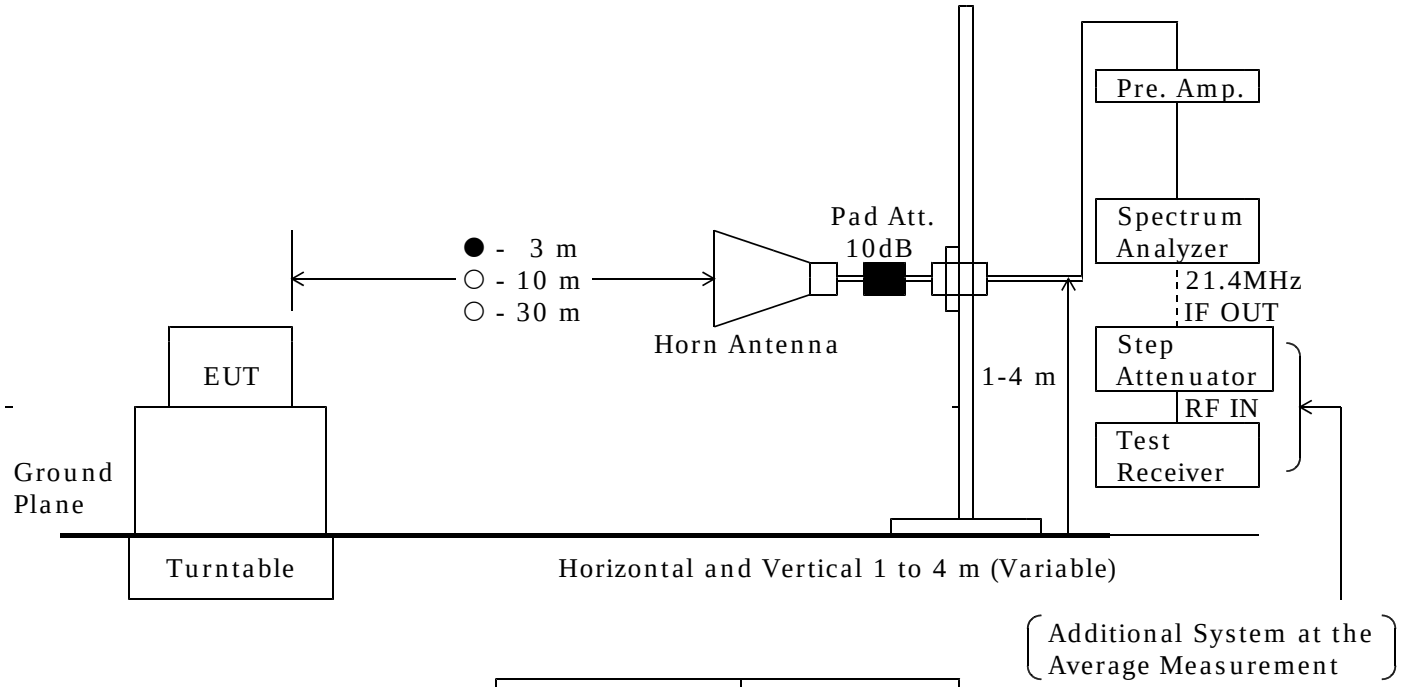
Electromagnetic Field Radiated Emission 30 MHz - 1000 MHz:

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).



Spectrum Analyzer Setting:

Resolution B.W.	3 MHz
Video B.W.	3 MHz
SPAN	0 Hz
SCALE	LINEAR

Test-Setup (Photographs) at worst case

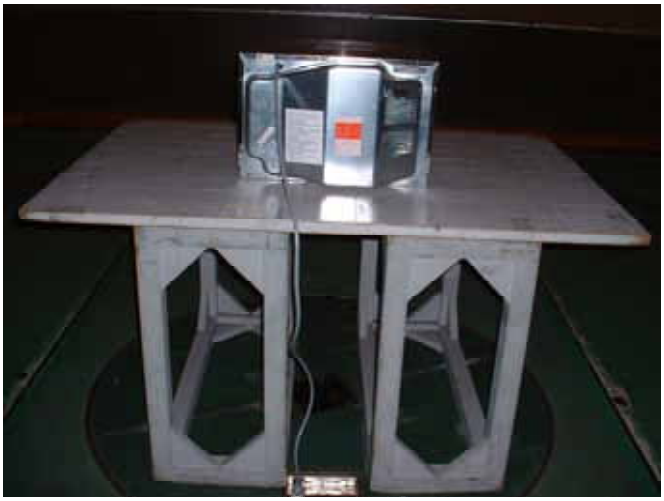
Conducted Emission 150kHz - 30MHz:

Front View

Radiated Emission 30MHz - 1000MHz:

Front View

Side View



Rear View

RF Power Output Measurement

ISM Frequency Device

Supply Voltage : 208VAC 60Hz

Test Date: May 11, 2005
Temp.: 27 °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) : 2000 ml
Measurement time : 47.0 sec. (calculated by the rated RF power output)

No.	Water temperature [°C] t_1 (before test)	Water temperature [°C] t_2 (after test)	RF Power Output (※) [W]
1	10.45	20.30	1760.4
2	10.80	20.85	1796.2
3	9.95	20.00	1796.2
4	10.25	20.15	1769.4
5	10.80	20.85	1796.2
Average			1783.7

※) RF Power Output [W] = $4.2 \times 2000 \times (t_2 - t_1) / 47.0$

Results of RF power output : 1783.7 W

The limit of the radiated emission at 300 m : $25 \times \sqrt{1783.7/500} = 47.2$ [μV/m] = 33.5 [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 : 2900 W
Measured AC power input : AC 208 V, 13.65 A, 2766 W

Tester : Akio Hosoda

Supply Voltage : 230VAC 60Hz

Test Date: May 11, 2005
Temp.: 27 °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) : 2000 ml
Measurement time : 47.0 sec. (calculated by the rated RF power output)

No.	Water temperature [°C] t_1 (before test)	Water temperature [°C] t_2 (after test)	RF Power Output (※) [W]
1	9.65	19.75	1805.1
2	10.50	20.65	1814.0
3	11.10	21.35	1831.9
4	10.50	20.60	1805.1
5	10.65	20.90	1831.9
Average			1817.6

※) RF Power Output [W] = $4.2 \times 2000 \times (t_2 - t_1) / 47.0$

Results of RF power output : 1817.6 W

The limit of the radiated emission at 300 m : $25 \times \sqrt{1817.6/500} = 47.7$ [μV/m] = 33.6 [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 : 2900 W
Measured AC power input : AC 230 V, 12.76 A, 2842 W

Tester : Akio Hosoda

ISM Frequency Measurement

ISM Frequency Device

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

Supply Voltage : 208VAC 60Hz

Test Date: May 23, 2005
Temp.: 19 °C ; Humi.: 78 %

Maximum Frequency Deviation [MHz]		Voltage	Remarks
Lower Frequency	Upper Frequency	Variation	
2425.3	2473.8	166.4V (80 %)	A
2415.7	2476.6	208.0V (100 %)	A
2429.6	2472.0	260.0V (125 %)	A

Supply Voltage : 230VAC 60Hz

Test Date: May 24, 2005
Temp.: 24 °C ; Humi.: 40 %

Maximum Frequency Deviation [MHz]		Voltage	Remarks
Lower Frequency	Upper Frequency	Variation	
2438.0	2479.3	166.4V (80 %)	A
2410.7	2476.3	208.0V (100 %)	A
2438.5	2476.7	260.0V (125 %)	A

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

AC Powerline Conducted Emission Measurement

Test Date: May 20, 2005

Test condition : 208V 60Hz

Temp.: 23 °C, Humi: 58 %

Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dB(μV)] VA QP	VA AVE	VB QP	VB AVE	Limits [dB(μV)] QP	Limits [dB(μV)] AVE	Results [dB(μV)] QP	Results [dB(μV)] AVE	Margin [dB]	Remarks
0.24	0.2	35.0	--	36.0	--	62.1	52.1	36.2	--	+25.9	A
0.28	0.1	35.0	--	35.0	--	60.8	50.8	35.1	--	+25.7	A
0.50	0.1	29.0	--	32.0	--	56.0	46.0	32.1	--	+23.9	A
1.00	0.1	30.0	--	30.0	--	56.0	46.0	30.1	--	+25.9	A
1.40	0.2	23.0	--	26.0	--	56.0	46.0	26.2	--	+29.8	A
2.00	0.2	26.0	--	26.0	--	56.0	46.0	26.2	--	+29.8	A
2.50	0.2	37.0	--	37.0	--	56.0	46.0	37.2	--	+18.8	A
8.40	0.5	31.0	--	30.0	--	60.0	50.0	31.5	--	+28.5	A
14.10	0.6	35.0	--	34.0	--	60.0	50.0	35.6	--	+24.4	A
15.27	0.7	35.0	--	36.0	--	60.0	50.0	36.7	--	+23.3	A

Sample of calculated result at 2.50 MHz, as the Minimum Margin point:

	Corr. Factor	=	0.2 dB
+)	Meter Reading	=	37.0 dB(μV)
	Result	=	37.2 dB(μV)

Minimum Margin: 56.0 - 37.2 = 18.8 (dB)

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

Note: The correction factor includes the LISN insertion loss and the cable loss.

Remarks:

	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

Tester : Akio Hosoda

AC Powerline Conducted Emission Measurement

Test Date: May 20, 2005

Test condition : 230V 60Hz

Temp.: 23 °C, Humi: 58 %

Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dB(μV)] VA QP	VA AVE	VB QP	VB AVE	Limits [dB(μV)] QP	Limits [dB(μV)] AVE	Results [dB(μV)] QP	Results [dB(μV)] AVE	Margin [dB]	Remarks
0.15	0.2	40.0	--	40.0	--	66.0	56.0	40.2	--	+25.8	A
0.24	0.2	40.0	--	42.0	--	62.1	52.1	42.2	--	+19.9	A
0.28	0.1	37.0	--	38.0	--	60.8	50.8	38.1	--	+22.7	A
0.50	0.1	31.0	--	36.0	--	56.0	46.0	36.1	--	+19.9	A
1.00	0.1	23.0	--	28.0	--	56.0	46.0	28.1	--	+27.9	A
2.50	0.2	38.0	--	38.0	--	56.0	46.0	38.2	--	+17.8	A
2.70	0.2	31.0	--	30.0	--	56.0	46.0	31.2	--	+24.8	A
14.78	0.6	36.0	--	36.0	--	60.0	50.0	36.6	--	+23.4	A
15.15	0.7	35.0	--	35.0	--	60.0	50.0	35.7	--	+24.3	A
16.00	0.7	34.0	--	35.0	--	60.0	50.0	35.7	--	+24.3	A

Sample of calculated result at 2.50 MHz, as the Minimum Margin point:

	Corr. Factor	=	0.2 dB
+)	Meter Reading	=	38.0 dB(μV)
	Result	=	38.2 dB(μV)

Minimum Margin: 56.0 - 38.2 = 17.8 (dB)

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

Note: The correction factor includes the LISN insertion loss and the cable loss.

Remarks:

	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 22, 2005

Test condition : 208VAC 60Hz

Temp.: 24 °C, Humi: 68 %

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
0.01	6.4	< 36.0	33.5	< 2.4	> +31.1	A
0.02	2.6	< 30.0	33.5	< - 7.4	> +40.9	A
0.03	1.9	< 30.0	33.5	< - 8.1	> +41.6	A
0.05	0.6	< 30.0	33.5	< - 9.4	> +42.9	A
0.15	0.1	< 30.0	33.5	< - 9.9	> +43.4	B
0.20	0.1	< 30.0	33.5	< - 9.9	> +43.4	B
2.00	0.0	< 30.0	33.5	< -10.0	> +43.5	B
5.00	-0.2	< 30.0	33.5	< -10.2	> +43.7	B
22.00	0.8	< 30.0	33.5	< - 9.2	> +42.7	B
29.90	1.8	< 30.0	33.5	< - 8.2	> +41.7	B

Calculated result at 0.01 MHz, as the worst point shown on underline:

Corr. Factor	=	6.4 dB(1/m)	
Conversion Factor	=	-40.0 dB	(20dB/decade)
+) Meter Reading	=	<36.0 dB(μV)	
Result	=	<2.4 dB(μV/m) at 300 m	= <1.3 μV/m

Minimum Margin: 33.5 - <2.4 = >31.1 (dB)

NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 9 kHz to 30 MHz.
3. The correction factor includes the antenna factor and the cable loss.
4. The symbol of “<” means “or less”.
5. The symbol of “>” means “more than”.
6. Setting of measuring instrument(s) :

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

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 22, 2005

Test condition : 230VAC 60Hz

Temp.: 24 °C, Humi: 68 %

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
0.01	6.4	< 36.0	33.6	< 2.4	> +31.2	A
0.02	2.6	< 30.0	33.6	< - 7.4	> +41.0	A
0.03	1.9	< 30.0	33.6	< - 8.1	> +41.7	A
0.05	0.6	< 30.0	33.6	< - 9.4	> +43.0	A
0.15	0.1	< 30.0	33.6	< - 9.9	> +43.5	B
0.20	0.1	< 30.0	33.6	< - 9.9	> +43.5	B
2.00	0.0	< 30.0	33.6	< -10.0	> +43.6	B
5.00	-0.2	< 30.0	33.6	< -10.2	> +43.8	B
22.00	0.8	< 30.0	33.6	< - 9.2	> +42.8	B
29.90	1.8	< 30.0	33.6	< - 8.2	> +41.8	B

Calculated result at 0.01 MHz, as the worst point shown on underline:

Corr. Factor	=	6.4	dB(1/m)	
Conversion Factor	=	-40.0	dB	(20dB/decade)
+) Meter Reading	=	<36.0	dB(μV)	
Result	=	<2.4	dB(μV/m) at 300 m	= <1.3 μV/m

Minimum Margin: 33.6 - <2.4 = >31.2 (dB)

NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 9 kHz to 30 MHz.
3. The correction factor includes the antenna factor and the cable loss.
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

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

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 16, 2005

Test condition : 208VAC 60Hz

Temp.: 17 °C, Humi: 43 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings at 10 m [dB(μV)] Hori.	Meter Readings at 10 m [dB(μV)] Vert.	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)] Hori.	Results at 300 m [dB(μV/m)] Vert.	Margin [dB]	Remarks
290.0	17.4	2.2	< 0.0	< 0.0	33.5	< - 9.9	< - 9.9	> +43.4	B
350.0	15.2	2.5	< 0.0	< 0.0	33.5	< -11.8	< -11.8	> +45.3	B
450.0	16.9	2.9	< 0.0	< 0.0	33.5	< - 9.7	< - 9.7	> +43.2	B
604.0	19.1	3.4	< 0.0	< 0.0	33.5	< - 7.0	< - 7.0	> +40.5	B
610.0	19.1	3.4	< 0.0	< 0.0	33.5	< - 7.0	< - 7.0	> +40.5	B
713.0	20.4	3.7	< 0.0	< 0.0	33.5	< - 5.4	< - 5.4	> +38.9	B
720.0	20.4	3.7	< 0.0	< 0.0	33.5	< - 5.4	< - 5.4	> +38.9	B
750.0	20.6	3.8	< 0.0	< 0.0	33.5	< - 5.1	< - 5.1	> +38.6	B
810.0	21.0	3.9	< 0.0	< 0.0	33.5	< - 4.6	< - 4.6	> +38.1	B
903.0	21.9	4.2	< 0.0	< 0.0	33.5	< - 3.4	< - 3.4	> +36.9	B

Calculated result at 903.0 MHz, as the worst point shown on underline:

Antenna Factor	=	21.9	dB(1/m)
Cable Loss	=	4.2	dB
Conversion Factor	=	-29.5	dB (20dB/decade)
+) Meter Reading	=	<0.0	dB(μV)
Result	=	<-3.4	dB(μV/m) at 300 m = <0.7 μV/m

Minimum Margin: 33.5 - (<-3.4) = >36.9 (dB)

NOTES

1. Test Distance : 10 m (Specified Distance : 300 m)
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Setting of measuring instrument(s) :

	Detector Function	IF Bandwidth	Antenna
A	CISPR QP	120 kHz	Broadband
B	Average	120 kHz	
C	CISPR QP	120 kHz	Tuned Dipole
D	Average	120 kHz	

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 16, 2005

Test condition : 230VAC 60Hz

Temp.: 17 °C, Humi: 43 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings at 10 m [dB(μV)] Hori.	Meter Readings at 10 m [dB(μV)] Vert.	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)] Hori.	Results at 300 m [dB(μV/m)] Vert.	Margin [dB]	Remarks
290.0	17.4	2.2	< 0.0	< 0.0	33.6	< - 9.9	< - 9.9	> +43.5	B
350.0	15.2	2.5	< 0.0	< 0.0	33.6	< -11.8	< -11.8	> +45.4	B
450.0	16.9	2.9	< 0.0	< 0.0	33.6	< - 9.7	< - 9.7	> +43.3	B
604.0	19.1	3.4	< 0.0	< 0.0	33.6	< - 7.0	< - 7.0	> +40.6	B
610.0	19.1	3.4	< 0.0	< 0.0	33.6	< - 7.0	< - 7.0	> +40.6	B
713.0	20.4	3.7	< 0.0	< 0.0	33.6	< - 5.4	< - 5.4	> +39.0	B
720.0	20.4	3.7	< 0.0	< 0.0	33.6	< - 5.4	< - 5.4	> +39.0	B
750.0	20.6	3.8	< 0.0	< 0.0	33.6	< - 5.1	< - 5.1	> +38.7	B
810.0	21.0	3.9	< 0.0	< 0.0	33.6	< - 4.6	< - 4.6	> +38.2	B
903.0	21.9	4.2	< 0.0	< 0.0	33.6	< - 3.4	< - 3.4	> +37.0	B

Calculated result at 903.0 MHz, as the worst point shown on underline:

Antenna Factor	=	21.9	dB(1/m)
Cable Loss	=	4.2	dB
Conversion Factor	=	-29.5	dB (20dB/decade)
+) Meter Reading	=	<0.0	dB(μV)
Result	=	<-3.4	dB(μV/m) at 300 m = <0.7 μV/m

Minimum Margin: 33.6 - (<-3.4) = >37.0 (dB)

NOTES

1. Test Distance : 10 m (Specified Distance : 300 m)
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Setting of measuring instrument(s) :

	Detector Function	IF Bandwidth	Antenna
A	CISPR QP	120 kHz	Broadband
B	Average	120 kHz	
C	CISPR QP	120 kHz	Tuned Dipole
D	Average	120 kHz	

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 23, 2005

Test condition : 208VAC 60Hz

Temp.: 19 °C, Humi: 78 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)] Hori.	Vert.	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)] Hori.	Vert.	Margin [dB]	Remarks
2397.0	21.5	10.8	29.0	32.0	33.5	21.3	24.3	+ 9.2	B
2503.0	21.2	10.8	< 25.0	< 25.0	33.5	< 17.0	< 17.0	> +16.5	B
4917.8	36.7	-21.4	35.0	41.0	33.5	10.3	16.3	+17.2	B
7374.4	37.4	-19.4	32.0	37.0	33.5	10.0	15.0	+18.5	B
8614.3	40.7	-27.3	35.0	46.0	33.5	8.4	19.4	+14.1	B
14725.0	45.5	-26.1	33.0	38.0	33.5	12.4	17.4	+16.1	B
17203.0	43.5	-26.5	36.0	40.0	33.5	13.0	17.0	+16.5	B
19733.0	40.3	-30.8	34.0	38.0	33.5	3.5	7.5	+26.0	B
22133.0	40.3	-30.8	38.0	39.0	33.5	7.5	8.5	+25.0	B
24600.0	40.4	-28.8	37.0	38.0	33.5	8.6	9.6	+23.9	B

Calculated result at 2397.0 MHz, as the worst point shown on underline:

Antenna Factor	=	21.5 dB(1/m)	
Corr. Factor	=	10.8 dB	
Conversion Factor	=	-40.0 dB	(20dB/decade)
+) Meter Reading	=	32.0 dB(μV)	
Result	=	24.3 dB(μV/m) at 300 m	= 16.4 μV/m

Minimum Margin: 33.5 - 24.3 = 9.2 (dB)

NOTES

1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1.0 GHz to 24.5 GHz.
3. The correction factor is shown as follows:
   - Corr. Factor [dB] = Cable Loss + 10dB Pad Att. [dB] (1.0 - 3.6GHz)
   - Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (3.6 - 7.6GHz)
   - Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   - Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (18.0 - 26.0GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

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

Tester : Akio Hosoda

Electromagnetic Field Radiated Emission Measurement

Test Date: May 24, 2005
Test condition : 230VAC 60Hz Temp.: 24 °C, Humi: 40 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings at 3 m [dB(μV)] Hori.	Vert.	Limits at 300 m [dB(μV/m)]	Results at 300 m [dB(μV/m)] Hori.	Vert.	Margin [dB]	Remarks
2397.0	21.5	10.8	29.0	32.0	33.6	21.3	24.3	+ 9.3	B
2503.0	21.2	10.8	< 25.0	< 25.0	33.6	< 17.0	< 17.0	> +16.5	B
2702.0	21.3	10.9	30.0	32.0	33.6	22.2	24.2	+ 9.4	B
2929.7	21.4	10.9	35.0	37.0	33.6	27.3	29.3	+ 4.3	B
6771.0	36.4	-19.8	30.0	33.0	33.6	6.6	9.6	+24.0	B
6896.0	36.6	-19.8	31.0	37.0	33.6	7.8	13.8	+19.8	B
7090.0	36.7	-19.7	33.0	37.0	33.6	10.0	14.0	+19.6	B
8189.0	40.9	-30.8	32.0	37.0	33.6	2.1	7.1	+26.5	B
8609.7	40.7	-30.8	38.0	42.0	33.6	7.9	11.9	+21.7	B
9854.9	39.2	-28.8	34.0	37.0	33.6	4.4	7.4	+26.2	B

Calculated result at 2929.7 MHz, as the worst point shown on underline:

Antenna Factor	=	21.4	dB(1/m)
Corr. Factor	=	-21.2	dB
Conversion Factor	=	-40.0	dB (20dB/decade)
+) Meter Reading	=	37.0	dB(μV)
Result	=	-2.8	dB(μV/m) at 300 m = 0.7 μV/m

Minimum Margin: 33.6 - -2.8 = 4.3 (dB)

NOTES
1. Test Distance : 3 m (Specified Distance : 300 m)
2. The spectrum was checked from 1.0 GHz to 24.5 GHz.
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. [dB] (1.0 - 3.6GHz)
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (3.6 - 7.6GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (18.0 - 26.0GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

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

Tester : Akio Hosoda