



FCC CFR47 PART 18 SUBPART C

CERTIFICATION TEST REPORT

FOR

MICROWAVE OVEN

MODEL NUMBER: R-520L

FCC ID: APYDMR0156

REPORT NUMBER: 08U12086-1

ISSUE DATE: OCTOBER 06, 2008

Prepared for

**SHARP CORPORATION
22-22 NAGAIKE-CHO
ABENO-KU RELIABILITY CONTROL GROOUP
OSAKA, JAPAN 545-8522**

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	10/06/08	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	5
4.2. <i>MEASUREMENT UNCERTAINTY</i>	5
5. EQUIPMENT UNDER TEST	6
5.1. <i>DESCRIPTION OF EUT</i>	6
5.2. <i>CLASS II CHANGE DESCRIPTION</i>	6
5.3. <i>MODE(S) OF OPERATION</i>	6
5.4. <i>MODIFICATIONS</i>	6
5.5. <i>DETAILS OF TESTED SYSTEM</i>	7
6. TEST AND MEASUREMENT EQUIPMENT	9
7. APPLICABLE LIMITS AND TEST RESULTS	10
7.1. <i>RADIO NOISE EMISSION MEASUREMENTS</i>	10
7.1.1. <i>RADIATION HAZARD MEASUREMENT</i>	10
7.1.2. <i>INPUT POWER</i>	12
7.1.3. <i>OUTPUT POWER</i>	13
7.1.4. <i>OPERATING FREQUENCY WITH TIME</i>	14
7.1.5. <i>OPERATING FREQUENCY WITH VOLTAGE</i>	16
7.1.6. <i>RADIATED EMISSIONS</i>	20
7.2. <i>AC MAINS LINE CONDUCTED EMISSIONS</i>	26
8. SETUP PHOTOS	30

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SHARP CORPORATION
22-22 NAGAIKE-CHO
ABENO-KU RELIBILITYCONTROL GROUP
OSAKA, JAPAN 545-8522

EUT DESCRIPTION: MICROWAVE OVEN

MODEL: R-520L

SERIAL NUMBER: 7G83500689

DATE TESTED: SEPTEMBER 13, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 18 SUBPART C	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC Part 18 Subpart C and FCC / OST MP-5, "FCC Method of Measurements of Radio Noise Emission From Industrial, Scientific, and Medical Equipment".

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Microwave Oven sold for consumer use with Maximum power 1200W.

GENERAL INFORMATION

CHASSIS MATERIAL	METAL
POWER REQUIREMENTS	115VAC / 60 Hz
MAGNETRON MODEL	TOSHIBA, 2M240J (L)

5.2. CLASS II CHANGE DESCRIPTION

Changes made to the subject approved product include the following:

- Add a new magnetron.

5.3. MODE(S) OF OPERATION

Mode	Description
Normal	Boiling water with maximum power

5.4. MODIFICATIONS

No modifications were made during testing.

5.5. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT

The EUT is stand-alone unit.

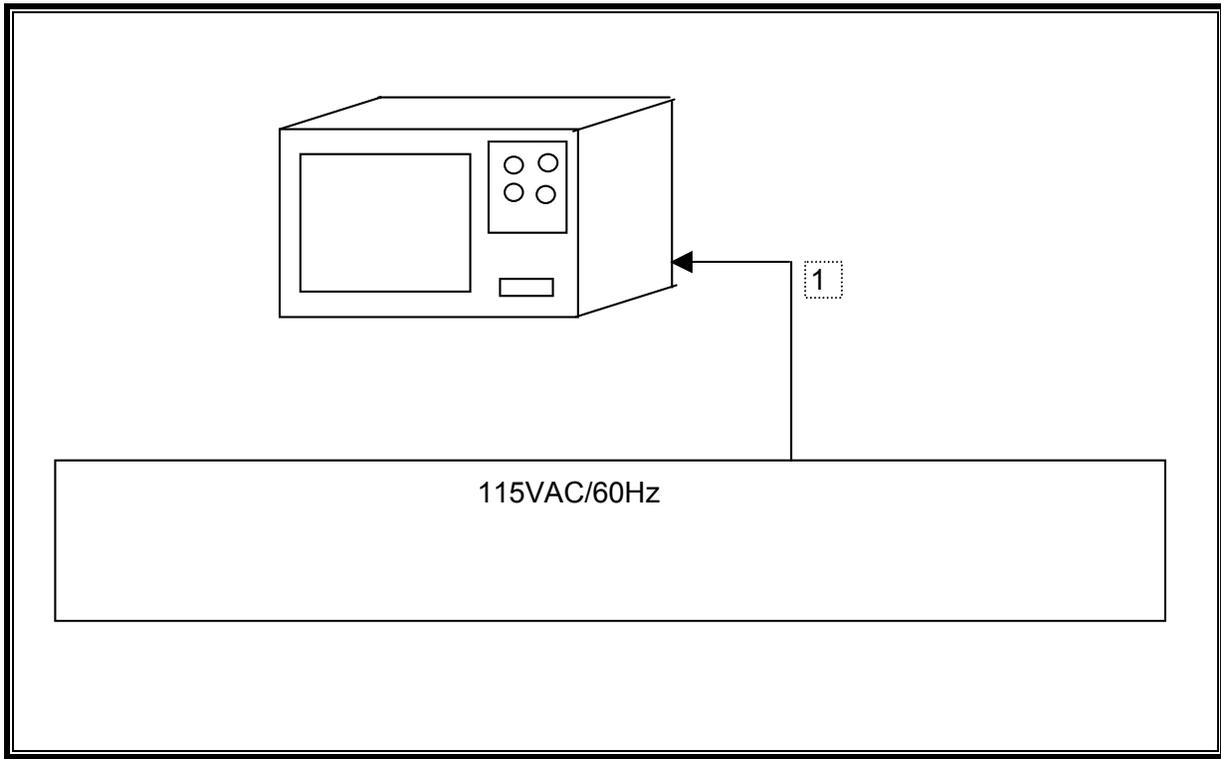
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	UNSHIELDED	1.8m	

TEST SETUP

The EUT is stand-alone unit.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	10/08/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/08
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	03/02/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/09
Thermostat	Made in Germany	NA	NA	CNR
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
Digital Power Analyzer	Valhalla	2111A	C00514	01/19/10
Microwave Leakage Tester	Simpson	228	N02385	CNR
Ajustable Power Supply	The Superior Electric Co.	Powerstat	NA	CNR

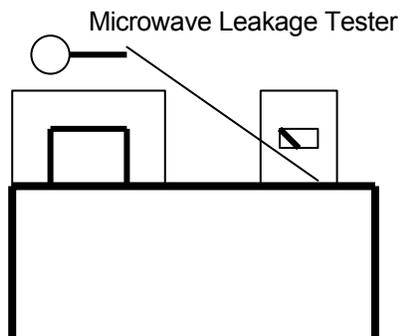
7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIO NOISE EMISSION MEASUREMENTS

7.1.1. RADIATION HAZARD MEASUREMENT

TEST PROCEDURE

A 700-ml water load was placed in the center of the oven. The power setting was set to 10 (100) maximum power. While the oven was operating, the STE probe was moved slowly around the door seams to check for leakage.



LIMIT

FCC / OST MP-5: SECTION 3.1 ($< 1.0\text{mW/cm}^2$)

RESULTS



Maximum leakage 0.1

	Maximum Leakage (mW/cm²)	Limit (mW/cm²)
Figure shown above for the location of maximum leakage	0.10	1.00
All Others	0.05	1.00

7.1.2. INPUT POWER

TEST PROCEDURE

Input power and current were measured using a wattmeter and an amp-meter. A 700 ml water load was placed in the center of the oven and the oven was set to 10 (100) maximum power. A 700-ml water load was chosen for its compatibility. Manufacturers to determine their input ratings commonly use this procedure.

LIMIT

FCC / OST MP-5: SECTION 4.3

Reporting: Input Power = Input Voltage * input current

RESULTS

Input Voltage (Vac)	Input Current (Amps)	Input Power (Watts)
115	14.9	1711.20

7.1.3. OUTPUT POWER

TEST PROCEDURE

The Caloric Method was used to determine maximum output power. The initial temperature of a 1000-ml water load was measured for ovens rated at 1000 watts or less power output. For ovens more than 1000 watts output, additional beakers by fraction thereof are used if necessary.

The water load was placed in the center of the oven. The oven was operated at maximum output power for 120 seconds. Then the temperature of the water was re-measured.

LIMIT

FCC / OST MP-5: SECTION 4.3

Reporting: Output power should be applied to the out-of-band emissions limit with the formula of $25\sqrt{\text{Power}/500}$ @ 300m.

RESULTS

Start Temperature (°C)	Final Temperature (°C)	Elapsed Time (120 Sec)	Water Volume (ml)	RF Power (Watts)
22	41.0	120	1000	665.00
23	42.5	120	1000	682.50
23	42.5	120	1000	682.50

Average of 3 Trials: 676.67 Watts

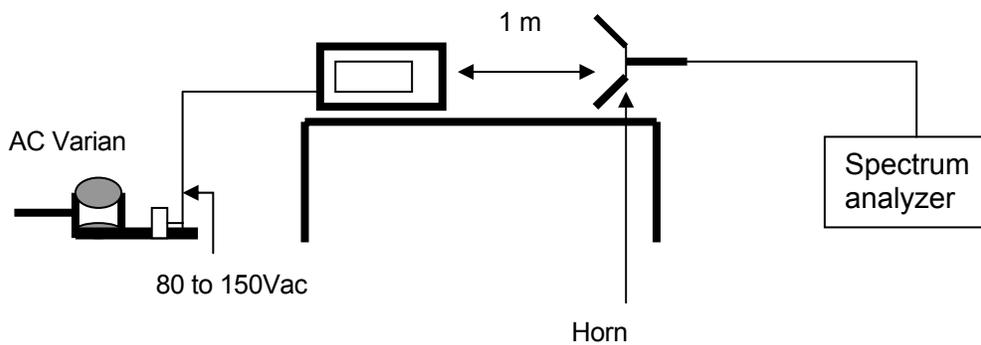
Output Power = $((4.2 \text{ Joules/Cal}) \times (\text{Volume in ml}) \times (\text{Temp. Rise})) / \text{Time in Seconds}$

7.1.4. OPERATING FREQUENCY WITH TIME

TEST PROCEDURE

The Caloric Method was used to determine maximum output power. The initial temperature of a 1000-ml water load was measured for ovens rated at 1000 watts or less power output. For ovens more than 1000 watts output, additional beakers by fraction thereof are used if necessary.

The fundamental operating frequency was monitor until the water load was reduced to 20% of the original load.



LIMIT

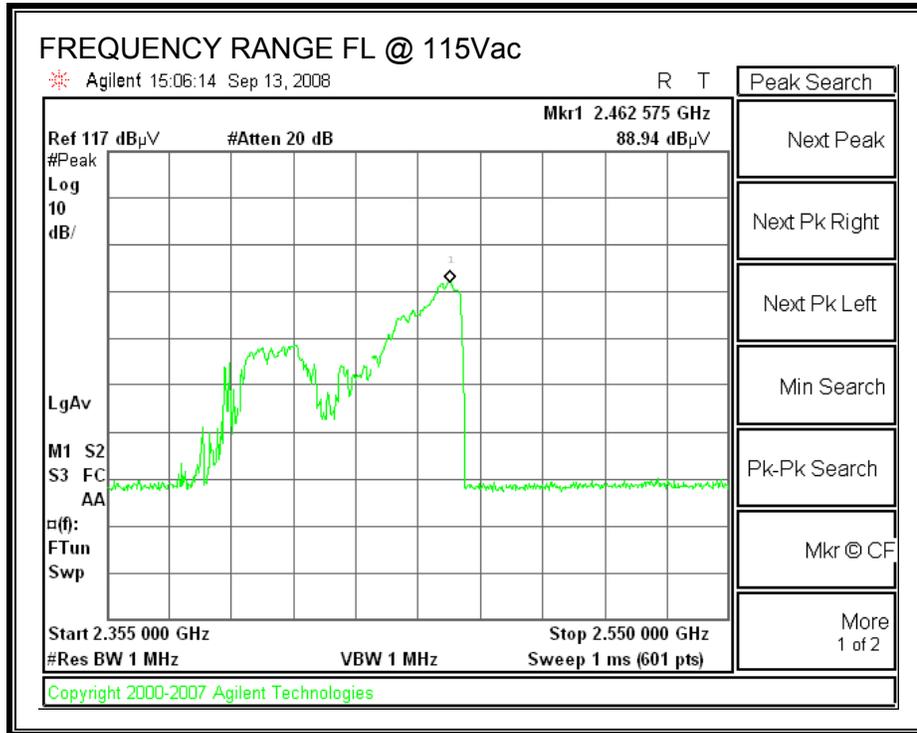
FCC / OST MP-5: SECTION 4.3

The frequency range shall lie within the band 2.4 GHz to 2.5 GHz from the peak ($f_L > 2.4$ GHz and $f_H < 2.5$ GHz) over Normal condition.

RESULTS

Condition	Frequency (MHz)
Normal	2462.6

VARIATION IN OPERATING FREQUENCY WITH TIME

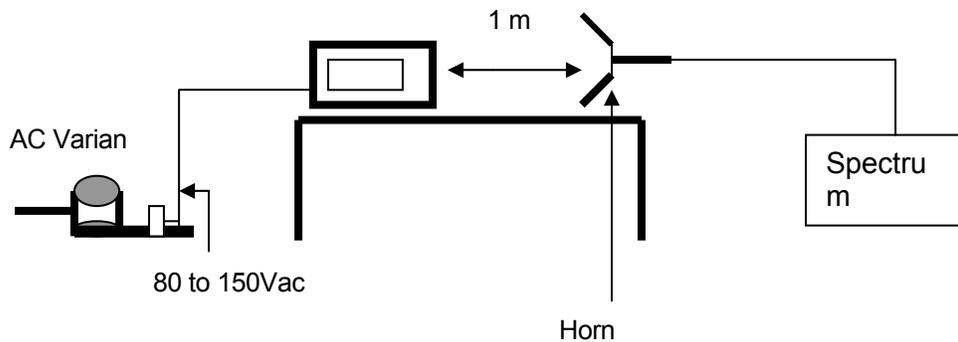


7.1.5. OPERATING FREQUENCY WITH VOLTAGE

TEST PROCEDURE

The Caloric Method was used to determine maximum output power. The initial temperature of a 1000-ml water load was measured for ovens rated at 1000 watts or less power output. For ovens more than 1000 watts output, additional beakers by fraction thereof are used if necessary.

The fundamental operating frequency was monitor until the water load was reduced to 20% of the original load, and the operating frequency was monitored as the input voltage was varied between 80 to 125 percent of the nominal rating.



LIMIT

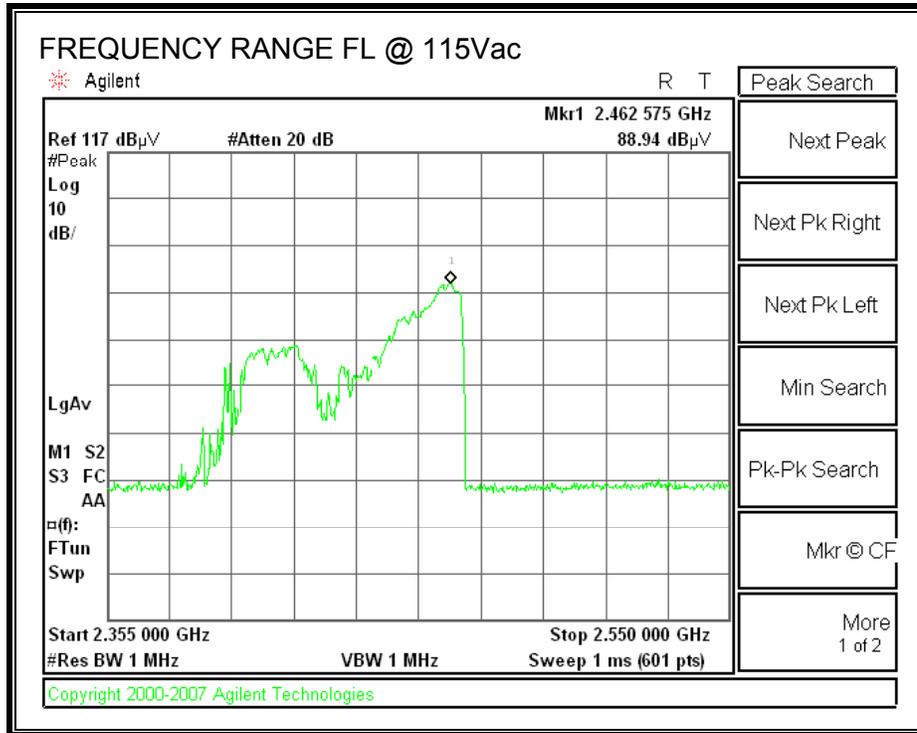
FCC / OST MP-5: SECTION 4.3

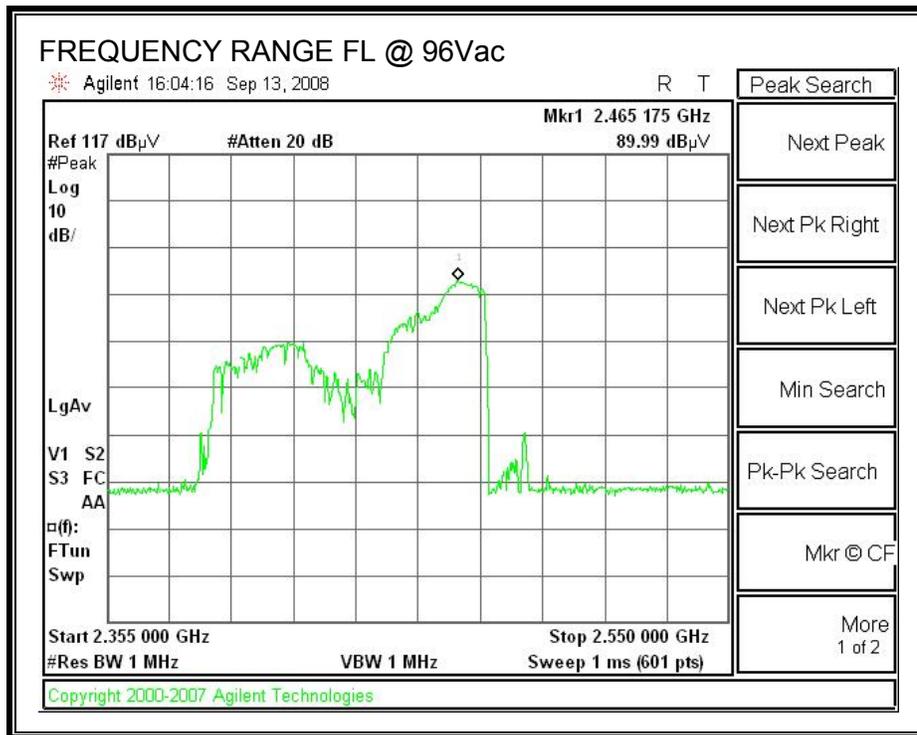
The frequency range shall lie within the band 2.4 GHz to 2.5 GHz from the peak ($f_L > 2.4$ GHz and $f_H < 2.5$ GHz) over Normal and Extreme voltages condition.

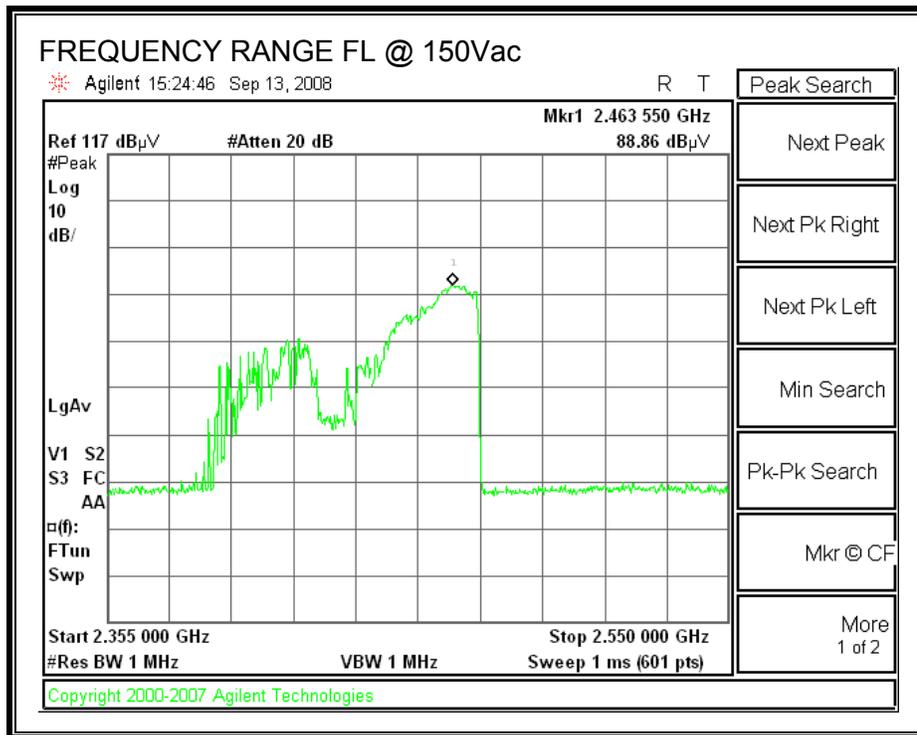
RESULTS

Condition	Frequency (MHz)
Normal	2462.6
Extreme V low (96Vac)	2465.2
Extreme V high (150Vac)	2463.6

VARIATION IN OPERATING FREQUENCY WITH VOLTAGE







7.1.6. RADIATED EMISSIONS

TEST PROCEDURE

FCC / OST MP-5

The fundamental clock frequency generated or used in the EUT is 2,450 MHz; therefore the frequency range was investigated from 30 MHz to 10th harmonic.

Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and other of 300 milliliters of water are used.

LIMIT

§18.305 (b) The field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency Distance	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500	25	300
	Any non-ISM frequency	500 or more	25×SQRT(power/ 500)	300

RESULTS

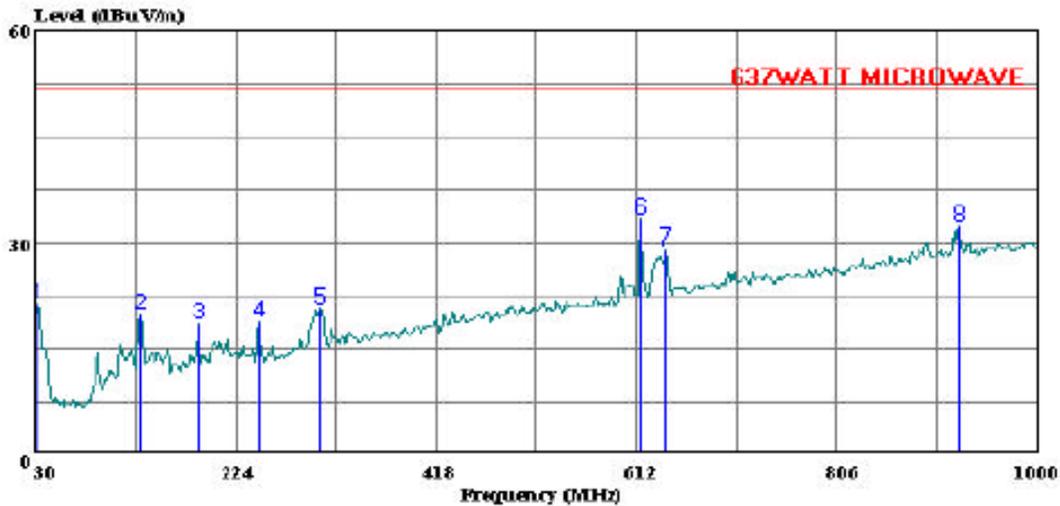
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 2 File#: 08u12086B.EMI Date: 09-13-2008 Time: 17:33:21



Trace: 1

Ref Trace:

Condition: 637WATT MICROWAVE HORIZONTAL
Test Operator:: Chin Pang
Project #: : 80U12086
Company: : Sharp Coporation
Configuration:: EUT only
Mode : : Boiling Water
Target: : FCC 18

HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	31.940	34.20	-12.62	21.58	49.30	-27.72	Peak
2	130.880	37.78	-17.84	19.94	49.30	-29.36	Peak
3	187.140	37.25	-18.44	18.81	49.30	-30.49	Peak
4	245.340	36.77	-17.77	19.00	49.30	-30.30	Peak
5	305.480	35.98	-15.32	20.66	49.30	-28.64	Peak
6	615.880	41.53	-8.18	33.35	49.30	-15.95	Peak
7	640.130	36.60	-7.64	28.96	49.30	-20.34	Peak
8	924.340	33.97	-1.77	32.20	49.30	-17.10	Peak

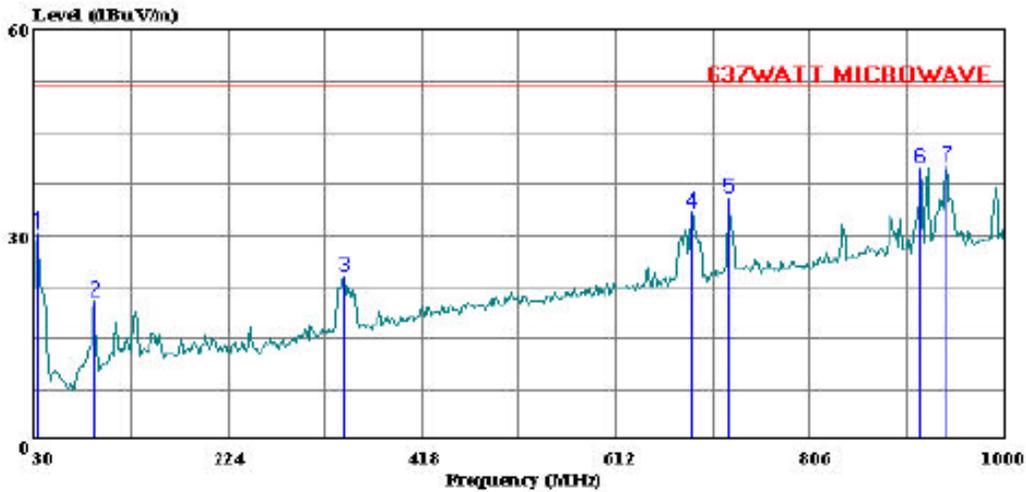
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 4 File#: 08U12086.EMI Date: 09-13-2008 Time: 16:59:24



Trace: 1

Ref Trace:

Condition: 637WATT MICROWAVE VERTICAL
Test Operator:: Chin Pang
Project #: : 80U12086
Company: : Sharp Coporation
Configuration: EUT only
Mode : : Boiling Water
Target: : FCC 18

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	33.880	44.14	-13.79	30.35	49.30	-18.95	Peak
2	90.140	43.93	-23.47	20.46	49.30	-28.84	Peak
3	339.430	38.62	-14.38	24.24	49.30	-25.26	Peak
4	688.630	39.78	-6.62	33.16	49.30	-16.14	Peak
5	725.490	41.04	-5.84	35.20	49.30	-14.10	Peak
6	916.580	41.75	-2.01	39.74	49.30	-9.56	Peak
7	943.740	41.42	-1.50	39.92	49.30	-9.38	Peak

SPURIOUS EMISSIONS ABOVE 1GHz (WORST-CASE CONFIGURATION)

HIGH FREQUENCY ABOVE 1GHz

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: Sharp
 Project #: 08U12086-1
 Date: 9/13/2008
 Test Engineer: Chin Pang
 Configuration: EUT Only
 Mode: Boiling water with Max Power

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-2	Pre-amplifer 26~	Horn > 18GHz	Limit
T73; S/N: 6717 @	T34 HP 8449B			FCC 18

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Fil	Output Power (W)
		A-5m Chamber		R_001	676.67

f GHz	Dist (m)	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Avg dBuV/m	Avg Lim dBuV/m	Avg Mar dB	Notes (V/H)
Without Preamp. Without Filter											
2.400	3.0	26.23	29.3	4.8	0.0	-40.0	0.0	20.4	29.3	-8.9	V
2.500	3.0	23.87	29.5	4.9	0.0	-40.0	0.0	18.3	29.3	-11.0	V
2.400	3.0	23.96	29.3	4.8	0.0	-40.0	0.0	18.1	29.3	-11.2	H
2.500	3.0	24.03	29.5	4.9	0.0	-40.0	0.0	18.5	29.3	-10.8	H
With Preamp. With Filter											
4.925	3.0	32.78	33.9	7.0	-34.8	-40.0	0.2	-1.0	29.3	-30.3	V
7.409	3.0	29.36	36.3	8.5	-34.1	-40.0	0.2	0.2	29.3	-29.0	V
8.519	3.0	36.45	37.1	8.8	-34.6	-40.0	0.2	8.1	29.3	-21.2	V
9.342	3.0	32.12	37.8	9.4	-34.4	-40.0	0.2	5.1	29.3	-24.2	V
14.760	3.0	30.45	40.9	12.5	-32.3	-40.0	0.2	11.7	29.3	-17.6	V
4.920	3.0	32.72	33.9	7.0	-34.8	-40.0	0.2	-1.1	29.3	-30.3	H
7.409	3.0	35.27	36.3	8.5	-34.1	-40.0	0.2	6.1	29.3	-23.1	H
9.833	3.0	32.19	38.0	9.9	-33.1	-40.0	0.2	7.2	29.3	-22.1	H
14.750	3.0	31.47	40.9	12.5	-32.3	-40.0	0.2	12.7	29.3	-16.6	H

Rev. 4.12.7

7.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

FCC / OST MP-5

LIMIT

§ FCC 18.307 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

RESULTS

6 WORST EMISSIONS

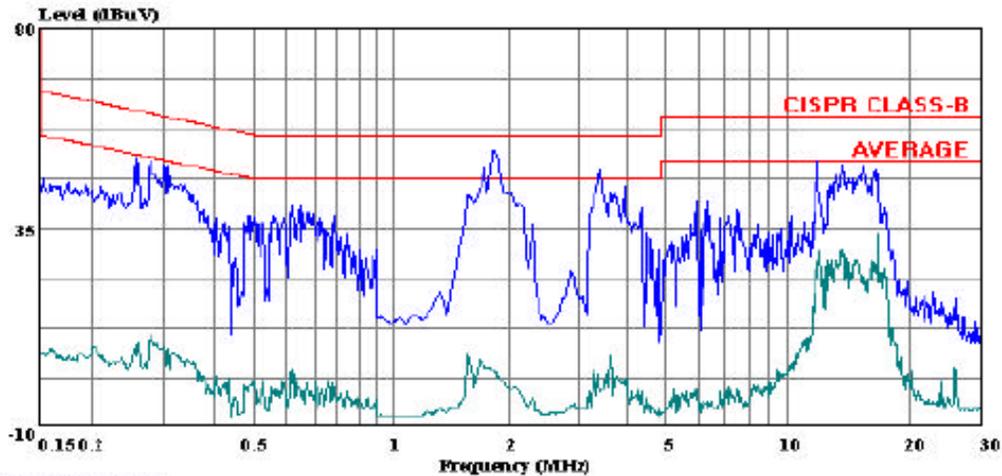
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	FCC 18 AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.26	50.33	--	11.01	0.00	61.56	51.56	-11.23	-40.55	L1
1.93	52.49	--	6.88	0.00	56.00	46.00	-3.51	-39.12	L1
13.77	49.12	--	33.97	0.00	60.00	50.00	-10.88	-16.03	L1
0.29	50.22	--	8.66	0.00	60.67	50.67	-10.45	-42.01	L2
1.03	51.96	--	9.53	0.00	56.00	46.00	-4.04	-36.47	L2
12.00	50.37	--	35.47	0.00	60.00	50.00	-9.63	-14.53	L2
6 Worst Data									

LINE 1 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 08U12086.EMI Date: 09-13-2008 Time: 14:56:21



(Line Conduction)

Trace: 5

Ref Trace:

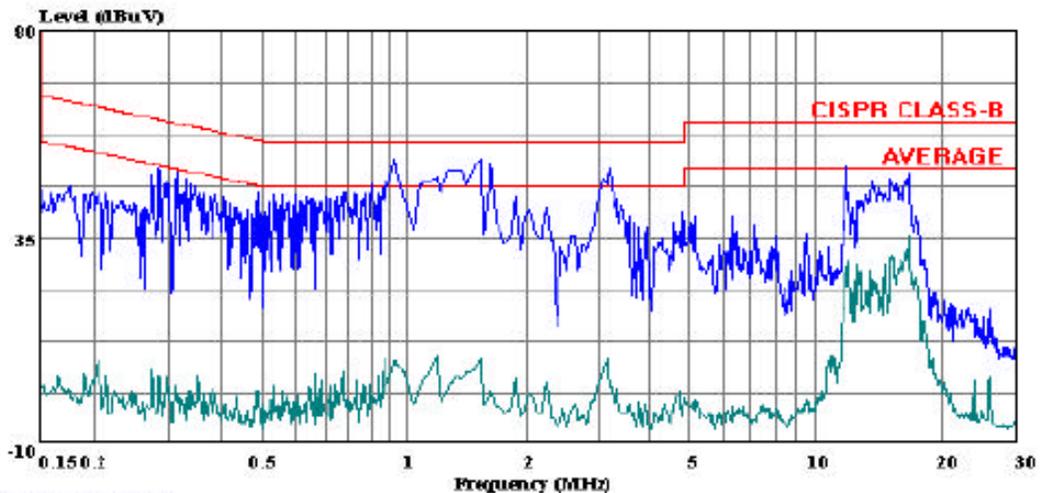
Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: 08U12086
Company: Sharp
Configuration: EUT Only
Mode: Boiling water
Target: FCC 18
Voltage: 115VAc 60Hz
: L1: Peak(Blue), Avg (Green)

LINE 2 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 08U12086.EMI Date: 09-13-2008 Time: 15:02:00



(Line Conduction)

Trace: 12

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: : 08U12086
Company: : Sharp
Configuration:: EUT Only
Mode: : Boiling water
Target: : FCC 18
Voltage: : 115VAc 60Hz
: L2: Peak(Blue), Avg (Green)