TEST REPORT

FCC PART 15 & PART 18 CERTIFICATION REPORT

FOR LOW POWER DEVICE

TEST REPORT No.: HM107891

Equipment Under Test [EUT]:	Microwave oven
Model Number:	62612
Applicant:	Whirlpool Microwave Products Development Ltd.
FCC ID :	PR46261X

CONTENT:

Appendix A

Appendix B

CONCLUSION

The submitted product was deemed to have COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15 & Part 18. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Verify by

Patrick Wong
for Chief Executive

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

Telephone: 852 2666 1888
Fax: 852 2664 4353

1.2 Applicant Details

Applicant

Whirlpool Microwave Products Development Ltd.
16/F., Paliburg Plaza, 68 Yee Wo Street,
Causeway Bay, Hong Kong

Telephone: 86 755 3433891
Fax: 86 755 3433906

HKSTC Code Number for Applicant **WHM001**

Manufacturer

Shunde Whirlpool Electrical Appliances Co., Ltd.
No. 2 Gong Ye Road, Beijiao, Shunde, Guangdong, China

Telephone: 86 765 6656922
Fax: 86 765 6656931

1.3 Equipment Under Test [EUT]

Description of Sample

Product:	Microwave Oven
Manufacturer:	Shunde Whirlpool Electrical Appliances Co., Ltd.
Brand Name:	Kenmore
Model Number:	62612
Input Voltage:	120Va.c. 15A 1800W 60Hz
Additional Model No./Brand Name:	62614/Kenmore, 62617/Kenmore, 62619/Kenmore, 6270x series/Sears

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Whirlpool Microwave Products Development Ltd. Microwave Oven.

1.4 Date of Order

2002-05-17

1.5 Submitted Sample(s):

2 Samples per model

1.6 Test Duration

2002-08-20

1.7 Country of Origin

China

1.8 Additional Information of EUT

	Submitted	Not Available
User Manual	☒	☐
Part List	☒	☐
Circuit Diagram	☒	☐
Printed Circuit Board [PCB] Layout	☒	☐
Block diagram	☒	☐
FCC ID Label	☒	☐

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC Part 15 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Radiated Emission, 0.15MHz to 30MHz	FCC Part 15.109	ANSI C63.4	N/A	☒	☐	☐
Radiated Emission, 1000MHz to 18GHz	FCC Part 18 Subpart C	FCC / OST MP-5	N/A	☒	☐	☐
Input Power Measurement	FCC Part 18 Subpart C	FCC / OST MP-5	N/A	☒	☐	☐
Output Power Measurement	FCC Part 18 Subpart C	FCC / OST MP-5	N/A	☒	☐	☐
Measurement of Output Frequency	FCC Part 18 Subpart C	FCC / OST MP-5	N/A	☒	☐	☐
Output Frequency Stability	FCC Part 18 Subpart C	FCC / OST MP-5	N/A	☒	☐	☐
Conducted Emission	FCC Part 15.207	ANSI C63.4	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

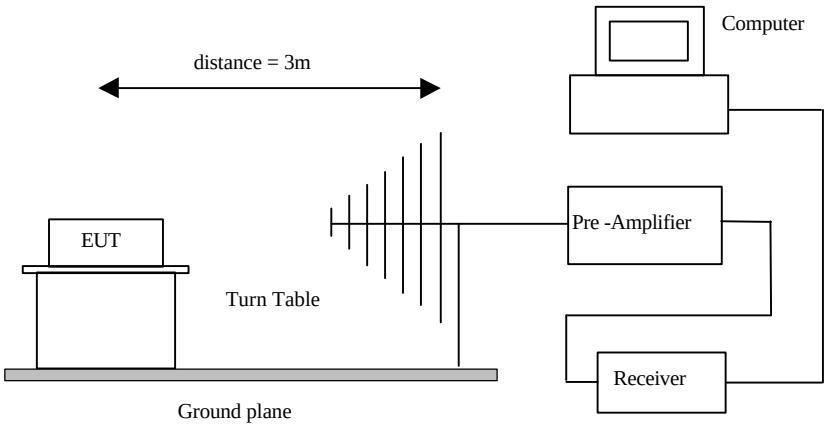
Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

The sample was placed 0.8m above the ground plane on the OATS *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigate all operating modes, rotated about all 3 axis (X, Y & Z) to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

*: OATS [Open Area Test Site] located at HKSTC with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90657.

Test Setup:



Radiated Emissions

Test Requirement: FCC Part 18 Subpart C
Test Method: FCC / OST MP-5
Test Date: 2002-08-20
Mode of Operation: On mode (max. power)

Results:

Field Strength of Spurious Emissions Peak Value					
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Limit @3m dBµV/m	Antenna Polarity
4918.60	< 1.0	60.92	< 27.62	3,715.4	Vertical
7377.90	< 1.0	67.12	< 33.60	3,715.4	Vertical
9837.20	< 1.0	67.84	< 33.90	3,715.4	Vertical
12296.50	< 1.0	67.42	< 34.60	3,715.4	Vertical
14755.80	< 1.0	71.44	< 39.90	3,715.4	Vertical
17215.10	< 1.0	67.44	< 35.20	3,715.4	Vertical

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty = 30MHz to 300MHz ±3.7dB
300MHz to 1GHz +3.0dB / -2.7dB

Radiated Emissions (100MHz to 18GHz)

Test Requirement: FCC Part 15 (Share with FCC Part 18)
Test Method: FCC / OST MP-5
Test Date: 2002-08-20
Mode of Operation: On mode (Microwave)

Results: On Mode (Microwave)

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	Antenna Polarity	Level .@3m dBµV/m	Limit .@3m dBµV/m	Level @3m .@3m µV/m	Limit .@3m µV/m
55.980	Vertical	18.02	40.0	8.0	100
512.400	Vertical	30.42	46.0	33.2	200
528.060	Vertical	21.93	46.0	12.5	200
798.660	Vertical	17.08	46.0	7.1	200
820.920	Vertical	16.85	46.0	7.0	200
1036.480	Vertical	28.87	54.0	27.8	500
90.720	Horizontal	16.98	43.5	7.1	150
171.960	Horizontal	17.08	43.5	7.1	150
440.520	Horizontal	23.40	46.0	14.8	200
538.380	Horizontal	33.18	46.0	45.6	200
836.280	Horizontal	26.33	46.0	20.7	200
1037.620	Horizontal	27.89	54.0	24.8	500

Remarks:

Calculated measurement uncertainty = ±2.3dB
-*- Emission greater than 30dB below limit line

Input Power Measurement

Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

Input power was measured using a Wattmeter. A 1000ml water load was located at the center of the oven. The oven was operated at full output power.

Results:

Input Measurement			Manufacturer's Rating	
Voltage (Vac)	**Current (A)**	**Input Power (W)**	**Current (A)**	**Input Power (W)**
120	15.36	1740	15	1800

Output Power Measurement

Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

The Output power was measured by the calorimetric method; using 1000ml load and evaluate the power output from the observed temperature rise of the load over a period of time.
The test method was based on clause 8 of IEC 705, Edition 3, Household Microwave Ovens – Methods for measuring performance.

Results:
°

Initial Temp (蚓)	Final Temp (蚓)	Observed Period (s)	Output Power (W)
10	23.1	50	1096.99

Remark:

$$\text{Power (W)} = \frac{4.187\ (\text{joules / cal}) \times \text{Volume (ml)} \times \text{ÄT}}{50}$$

$$\text{Power (W)} = \frac{4.187 \times 1000 \times 13.1}{50} = 1096.99\ (\text{W})$$

Measurement of Output Frequency

Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

The fundamental frequency was measured using a spectrum analyzer with precision frequency reference, with 1000ml load at the center of the oven.

Results:

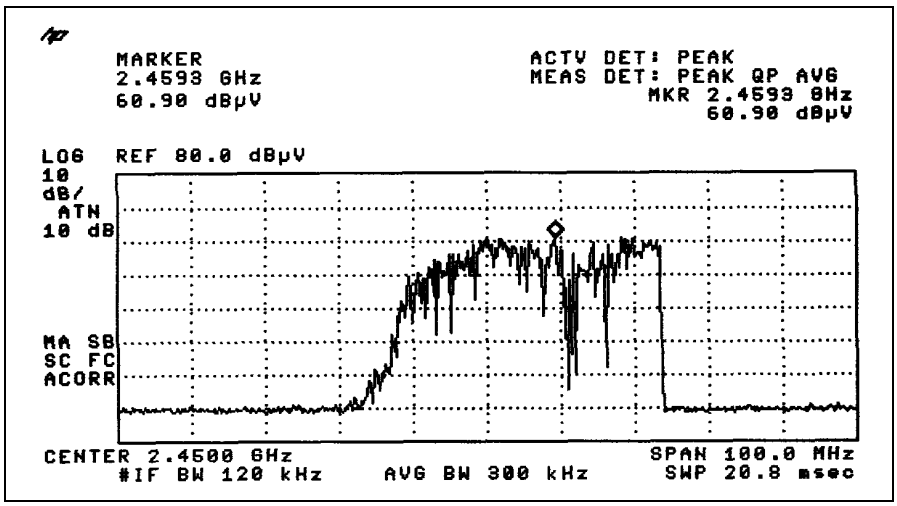
°

Measured Frequncy (MHz)	Manufacturer's Rated Frequency (MHz)
2459.3	2450

Remark:

See graphical (A)

Graphical (A)



Output Frequency Stability

Test Requirement: FCC Part 18 Subpart C
Test Method: FCC / OST MP-5
Test Date: 2002-08-20
Mode of Operation: On mode (max. power)

Test Method:

A spectrum analyzer was used to measure the frequency variation with time, with a 1000ml load located at the center of the oven with maximum power. The test was performed until the volume was reduced by evaporation to approximately 20% of the original quantity.
During the test, the spectrum analyzer trace was put on maximum hold in order to obtain a bandwidth plot showing the sideband edges.
Measurements were performed with the antenna in both horizontal and vertical polarities.

Results:
°

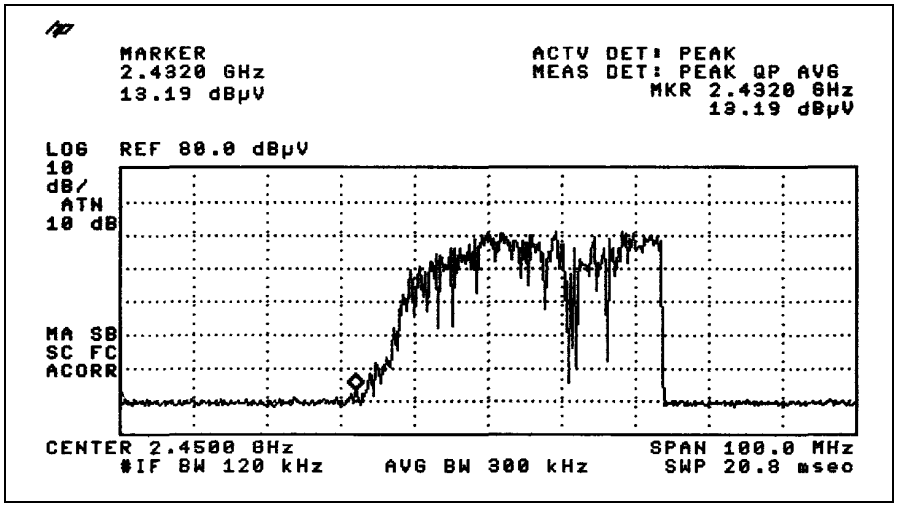
Load		**Maximum sideband edges (GHz)**		**Minimum sideband edges (GHz)**	
Initial Volume (ml)	Final Volume (ml)	Measured	Limit	Measured	Limit
1000	200	2.474	2.500	2.432	2.400

Remark:

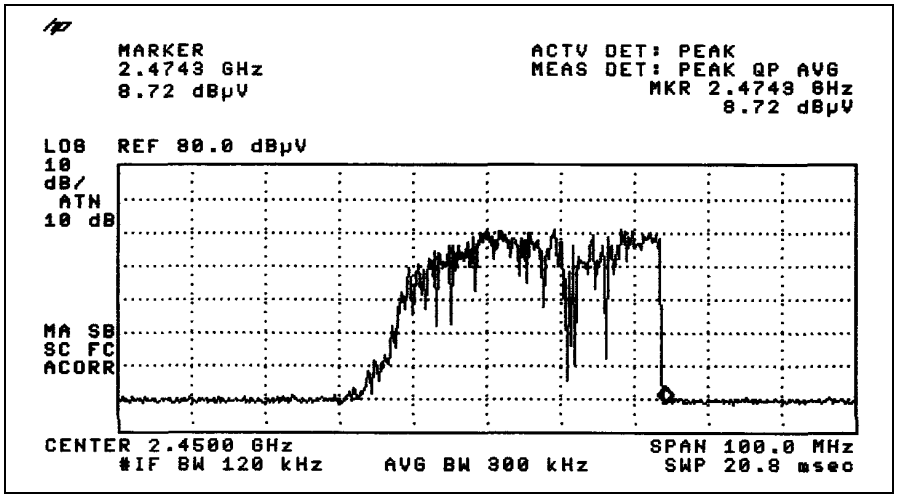
See graphical (B)

Graphical (B)

Min.



Max.



Frequency Variation With Line Voltage

Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

A spectrum analyzer was used to measure the frequency variation for line voltage variation from 80% to 125% of normal voltage, with a 1000ml load located at the center of the oven with maximum power. During the test, the spectrum analyzer trace was put on, maximum hold in order to obtain a bandwidth plot showing the sideband edges.
Measurements were performed with the antenna in both horizontal and vertical polarities.

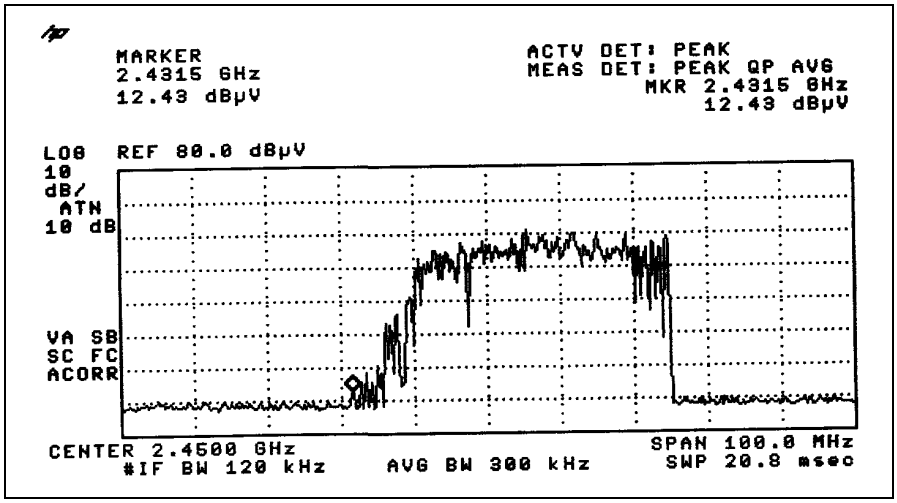
Results:
°

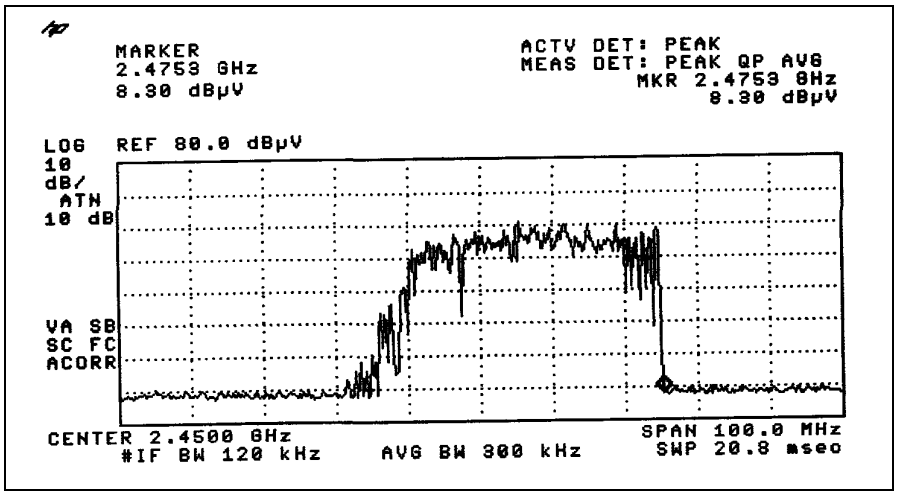
Voltage	Maximum sideband edges		Voltage	Minimum sideband edges	
(Vac)	Measured (GHz)	Limit (GHz)	(Vac)	Measured (GHz)	Limit (GHz)
150	2.475	2.500	150	2.432	2.400

Remark:

See graphical (C)

Graphical (C)


MARKER
2.4315 GHz
12.43 dBµV
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4315 GHz
12.43 dBµV
LOG
10
dB/
ATN
10 dB
REF 80.0 dBµV
VA SB
SC FC
ACORR
CENTER 2.4500 GHz
#IF BW 120 kHz
AVG BW 300 kHz
SPAN 100.0 MHz
SWP 20.8 msec


MARKER
2.4753 GHz
8.30 dBµV
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4753 GHz
8.30 dBµV
LOG
10
dB/
ATN
10 dB
REF 80.0 dBµV
VA SB
SC FC
ACORR
CENTER 2.4500 GHz
#IF BW 120 kHz
AVG BW 300 kHz
SPAN 100.0 MHz
SWP 20.8 msec

Frequency Variation With Line Voltage

Test Requirement:	FCC Part 18 Subpart C
Test Method:	FCC / OST MP-5
Test Date:	2002-08-20
Mode of Operation:	On mode (max. power)

Test Method:

A spectrum analyzer was used to measure the frequency variation for line voltage variation from 80% to 125% of normal voltage, with a 1000ml load located at the center of the oven with maximum power. During the test, the spectrum analyzer trace was put on, maximum hold in order to obtain a bandwidth plot showing the sideband edges.
Measurements were performed with the antenna in both horizontal and vertical polarities.

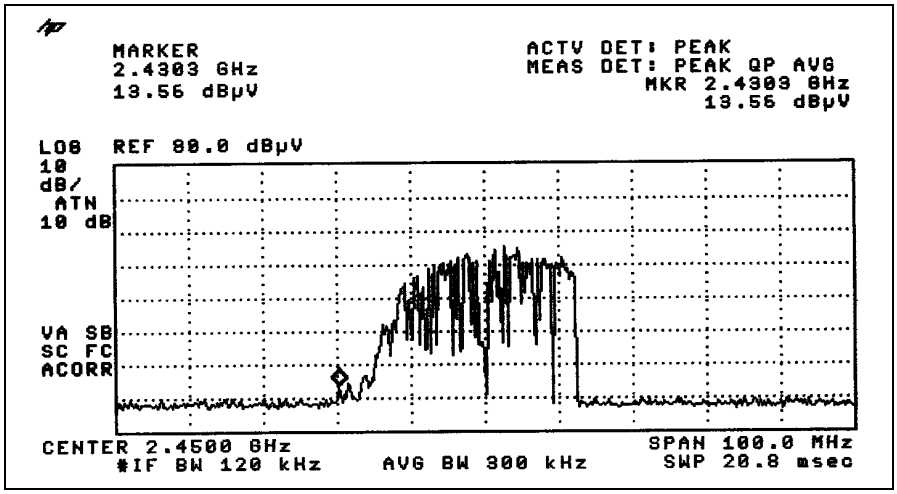
Results:
°

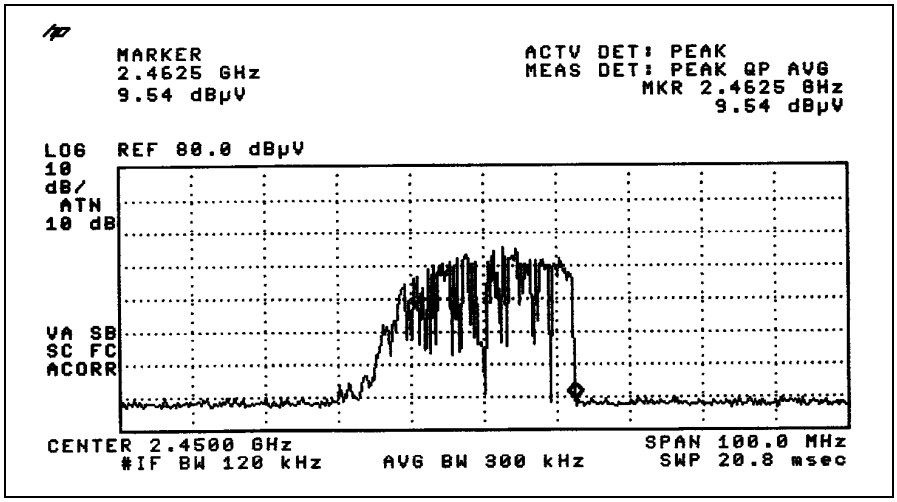
Voltage	Maximum sideband edges		Voltage	Minimum sideband edges	
(Vac)	Measured (GHz)	Limit (GHz)	(Vac)	Measured (GHz)	Limit (GHz)
96	2.463	2.500	96	2.430	2.400

Remark:

See graphical (D)

Graphical (D)


MARKER
2.4303 GHz
13.56 dBµV
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4303 GHz
13.56 dBµV
LOG
10
dB/
ATN
10 dB
REF 80.0 dBµV
VA SB
SC FC
ACORR
CENTER 2.4500 GHz
#IF BW 120 kHz
AVG BW 300 kHz
SPAN 100.0 MHz
SWP 20.8 msec


MARKER
2.4625 GHz
9.54 dBµV
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4625 GHz
9.54 dBµV
LOG
10
dB/
ATN
10 dB
REF 80.0 dBµV
VA SB
SC FC
ACORR
CENTER 2.4500 GHz
#IF BW 120 kHz
AVG BW 300 kHz
SPAN 100.0 MHz
SWP 20.8 msec

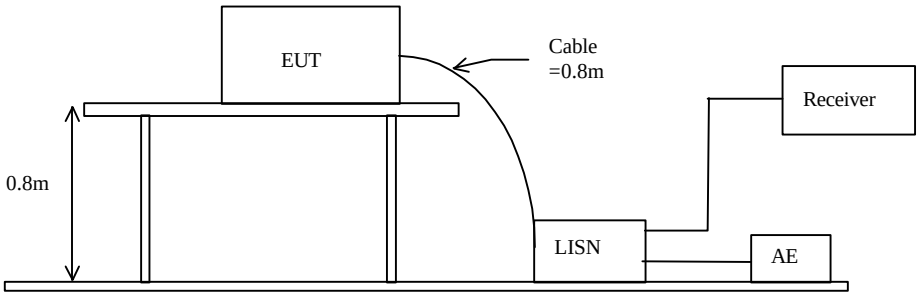
3.1.1 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2000
Test Date:	2002-08-20
Mode of Operation:	On Mode (Max. Power)

Test Method:

The test was performed in accordance with ANSI C63.4:2000, with the following: an initial measurement was performed in peak and average detection mode on the live line. Any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



Results: **On Mode (Max. Power)**

Conductor	Frequency	Quasi-peak			
		Level	Limit	Level	Limit
Live or Neutral	MHz	dB猩	dB猩	猩	猩
Live	0.462	36.52	48.0	67.0	250
Live	0.537	43.47	48.0	149.1	250
Live	0.624	39.52	48.0	94.6	250
Live	0.735	33.81	48.0	49.0	250
Live	0.888	29.51	48.0	29.9	250
Live	1.155	31.18	48.0	36.2	250
Live	1.395	32.13	48.0	40.4	250
Live	1.420	37.59	48.0	75.8	250
Live	1.745	33.90	48.0	49.5	250
Live	2.255	33.27	48.0	46.1	250
Live	2.405	42.23	48.0	129.3	250
Live	2.785	43.04	48.0	141.9	250
Live	3.455	29.15	48.0	28.7	250
Live	4.135	25.74	48.0	19.4	250
Live	4.665	25.88	48.0	19.7	250
Live	5.520	28.75	48.0	27.4	250
Live	6.760	18.84	48.0	8.7	250
Live	7.895	16.69	48.0	6.8	250
Live	10.750	27.93	48.0	24.9	250
Live	10.825	27.87	48.0	24.7	250
Live	14.880	31.76	48.0	38.7	250
Live	15.355	28.48	48.0	26.5	250
Live	20.010	25.69	48.0	19.3	250
Live	24.710	43.29	48.0	146.0	250
Live	26.230	17.34	48.0	7.4	250

To be continues…

Results: **On Mode (Max. Power)**

Conductor	Frequency	Quasi-peak			
		Level	Limit	Level	Limit
Live or Neutral	MHz	dB猩	dB猩	猩	猩
Neutral	0.480	38.50	48.0	84.1	250
Neutral	0.582	33.24	48.0	45.9	250
Neutral	0.711	42.91	48.0	139.8	250
Neutral	0.750	41.83	48.0	123.5	250
Neutral	0.858	39.63	48.0	95.8	250
Neutral	1.160	39.60	48.0	95.5	250
Neutral	1.195	33.51	48.0	47.4	250
Neutral	1.420	32.03	48.0	39.9	250
Neutral	1.940	32.08	48.0	40.2	250
Neutral	2.190	35.03	48.0	56.4	250
Neutral	2.385	35.76	48.0	61.4	250
Neutral	3.190	28.56	48.0	26.8	250
Neutral	3.485	32.20	48.0	40.7	250
Neutral	3.975	27.58	48.0	23.9	250
Neutral	4.835	34.04	48.0	50.4	250
Neutral	6.015	25.63	48.0	19.1	250
Neutral	7.190	28.07	48.0	25.3	250
Neutral	7.940	25.98	48.0	19.9	250
Neutral	10.785	28.98	48.0	28.1	250
Neutral	11.725	26.91	48.0	22.2	250
Neutral	14.935	37.53	48.0	75.2	250
Neutral	15.240	34.65	48.0	54.0	250
Neutral	20.435	24.71	48.0	17.2	250
Neutral	24.710	45.30	48.0	184.1	250
Neutral	27.520	18.35	48.0	8.3	250

Remarks:

Calculated measurement uncertainty = ±2.3dB
-*- Emission greater than 30dB below limit line

Conducted Emissions (0.45MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207
Test Method: ANSI C63.4:2000
Test Date: 2002-08-20
Mode of Operation: On Mode (Stand by mode)

Results: On Mode (Stand by mode)

Conductor	Frequency	Quasi-peak			
Live or Neutral	MHz	Level dB猩	Limit dB猩	Level 猩	Limit 猩
Live	0.450	35.85	48.0	62.0	250
Live	0.579	26.89	48.0	22.1	250
Live	0.726	13.78	48.0	4.9	250
Live	0.753	15.22	48.0	5.8	250
Live	0.897	12.54	48.0	4.2	250
Live	1.030	11.30	48.0	3.7	250
Live	4.000	11.07	48.0	3.6	250
Live	5.025	9.57	48.0	3.0	250
Live	5.900	9.99	48.0	3.2	250
Live	7.440	14.63	48.0	5.4	250
Live	8.005	16.85	48.0	7.0	250
Live	10.465	11.84	48.0	3.9	250
Live	11.415	10.41	48.0	3.3	250
Live	13.365	11.47	48.0	3.7	250
Live	16.000	25.98	48.0	19.9	250
Live	19.730	37.57	48.0	75.6	250
Live	24.710	37.57	48.0	75.6	250
Live	28.000	26.49	48.0	21.1	250

Remarks:

Calculated measurement uncertainty = ±2.3dB
-*- Emission greater than 30dB below limit line

Appendix A

Test Equipment Audit

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL.
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	07/09/01
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	07/09/01
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	07/09/01
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	07/09/01
EM011	ATTENNUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	07/09/01
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	07/09/01
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD & MOUSE FLOPPY DRIVE	HEWLETT PACKARD HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	CM
EM020	HORN ANTENNA	EMCO	3115	4032	19/07/00
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	04/08/00
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	14/02/02
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	18/12/01
EM145	EMI TEST RECEIVER	R & S	ESCS 30	830245/021	22/07/02
EM194	BICONILOG ANTENNA	EMCO	3142B	1795	14/05/02
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A

Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	04/10/01
EM002	LISN	EMCO	3825-2	9005-1657	22/08/01
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	31/08/00
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	CM
EM142	PULES LIMITER	R & S	ESH3Z2	357.8810.52	04/07/01
EM181	EMI TEST RECEIVER	R & S	ESIB7	100072	28/11/01
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A	02/01/02

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

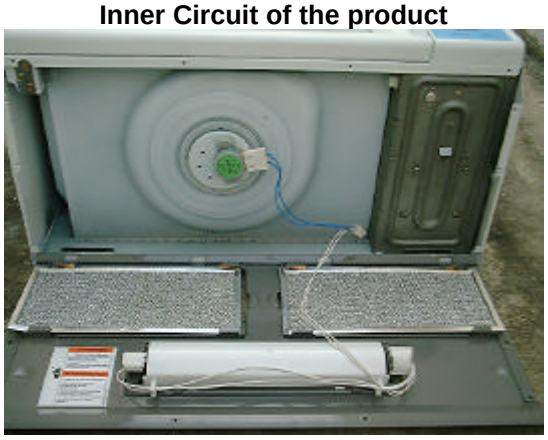
Appendix B

Photographs of EUT

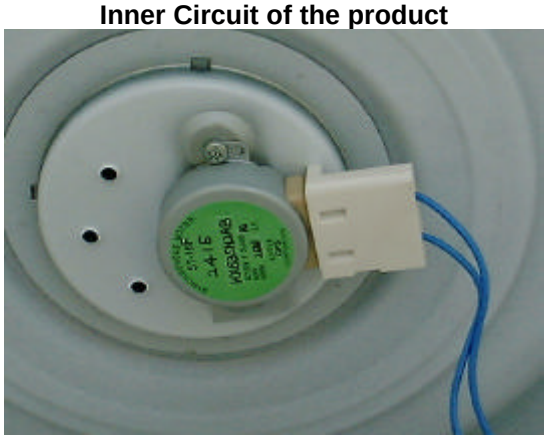
Front View of the product

Rear View of the product

Inner Circuit of the product

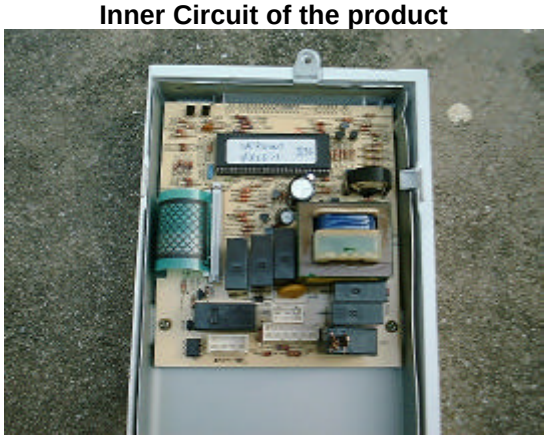


Inner Circuit of the product



Photographs of EUT

Inner Circuit of the product



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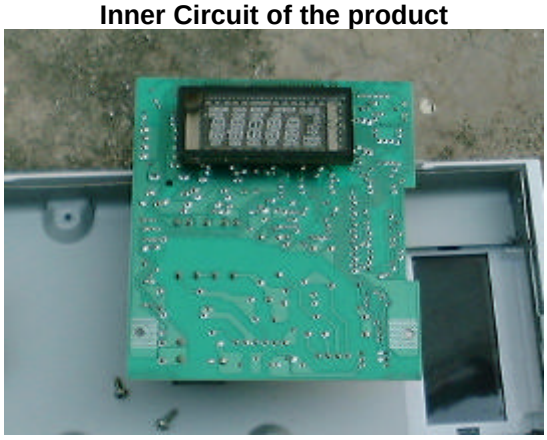

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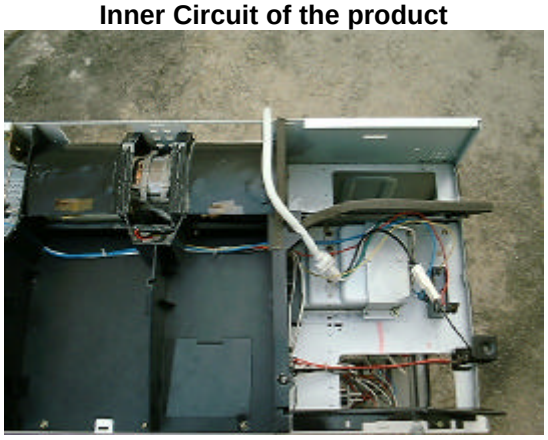

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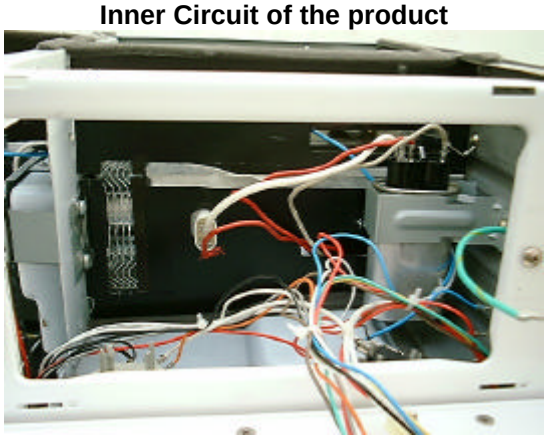
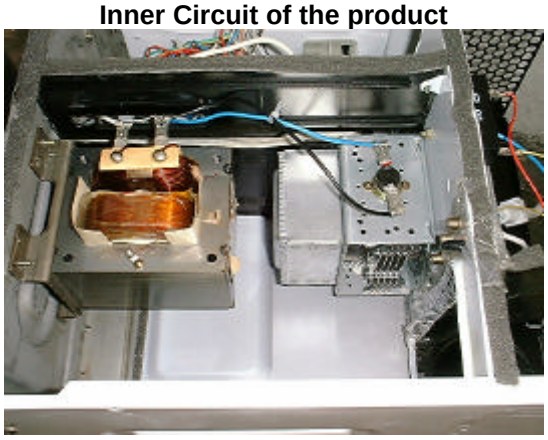


Photographs of EUT

Inner Circuit of the product



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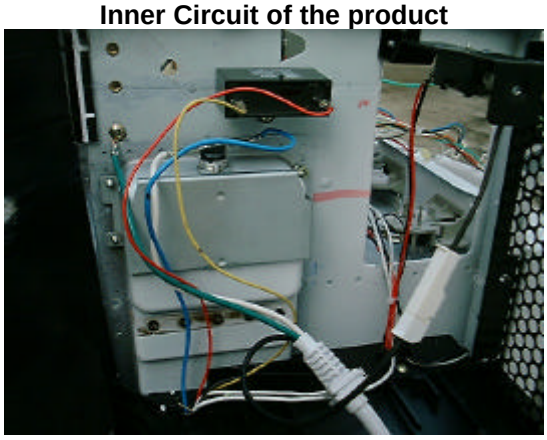

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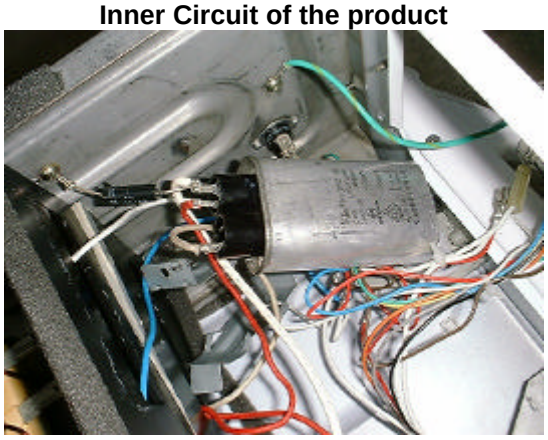

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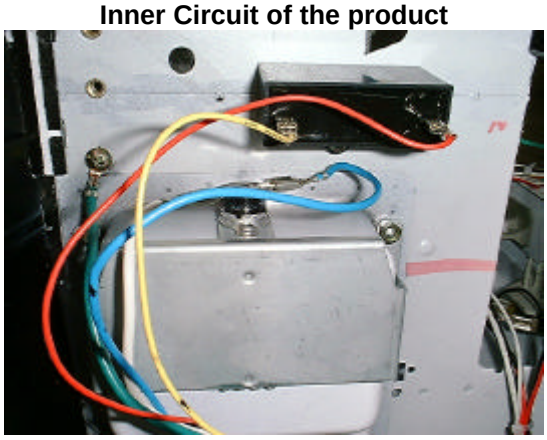
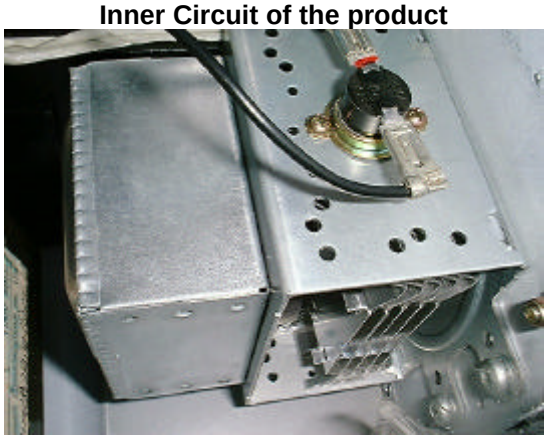


Photographs of EUT

Inner Circuit of the product



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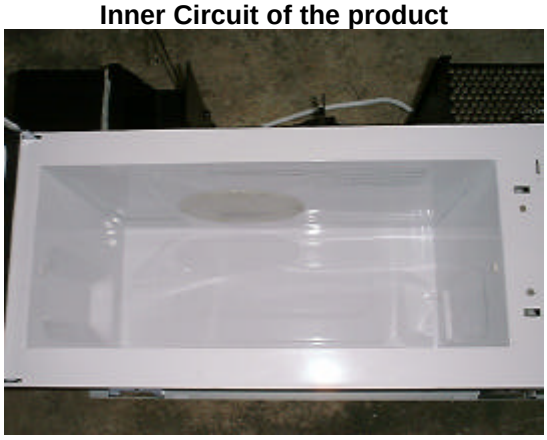
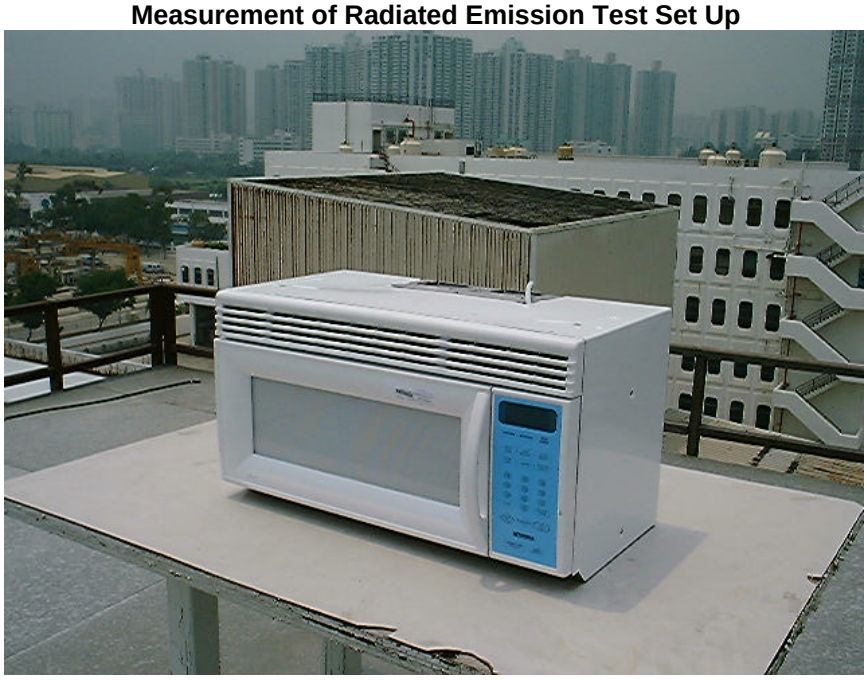


Measurement of Radiated Emission Test Set Up



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