

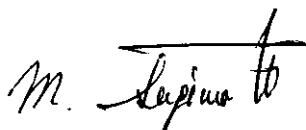
Report No. MO-067

Date : February 12, 1999

ENGINEERING TEST REPORT

1. Name of Manufacturer : SANYO Electric Co., Ltd.
5-5, Keihan-Hondori 2-chome,
Moriguchi City
Osaka 570, Japan
2. Description of Equipment : Microwave Oven
 - a. FCC ID : AEZA106
 - b. Model No. : EM-C60
 - c. Rated Power Supply : AC Single Phase 120V, 60Hz
 - d. Rated Power Consumption : 1,100 Watts
 - e. Operating Frequency : 2,450 MHz
 - f. RF (Microwave) Power : 600 Watts
 - g. Magnetron : 2M-232K(M)
3. Intended Use : Commercial Cooking Appliance
4. Measurement Procedure Used : FCC Rules Part 18,
Subpart B and C
5. Date of Measurement : December 17, 1998
January 14, 1999

I hereby certify that the tests reported herein were conducted in accordance with the method of measurement described in FCC Rules Part 18, Subpart B and C.



Muneaki Sugimoto, Section Manager
SANYO Electric Co., Ltd.
Microwave Oven Div. Engineering Dept.
Phone +81-77-543-5669 Fax +81-77-545-3583

Issued : February 12, 1999

18.207 TECHNICAL REPORT

(a) DESCRIPTION OF THE MEASUREMENT FACILITIES

- (1) SANYO Electric Co., Ltd. Shiga Measurement Station
..... Refer to Report No. FO-86-1 (February 1, 1986)
- (2) Kansai Electric Industry Development Center (KEC),
Ikoma Testing Laboratory, Open Test Site No. 2
..... Refer to Attachment #1C in this Test Report.

(a) A COPY OF THE INSTALLATION AND OPERATING INSTRUCTIONS

See Attachment #4.

(b) THE FULL NAME AND MAILING ADDRESS OF THE MANUFACTURER
FOR THE EQUIPMENT AUTHORIZATION

Mr. James Roach
SANYO Sales & Supply (U.S.A.) Corp.
Suite 300, N. Arlington Heights Road,
Itasca, Illinois 60143, U.S.A.

(c) THE FCC IDENTIFIER, MODEL NUMBER(S)

FCC ID : **AEZA106**
MODEL NO(S) : **EM-C60**

(d) STATEMENT OF THE RATED TECHNICAL PARAMETERS

- (1) Circuit Diagram : See Attachment #3
- (2) Nominal Operating Frequency : 2,450 MHz
- (3) Maximum RF Energy Generated : 600 Watts
- (4) Electrical Power Requirements of Equipment : 1,100 Watts
- (5) Any Other Pertinent Operating Characteristics : None.

(e) REPORT OF MEASUREMENTS

See Attachment #1, #1A, #1B, #1C and #1D

REPORT OF MEASUREMENTS (MICROWAVE OVEN TEST DATA)

FCC ID : AEZA106 MODEL : EM-C60 DATE : December 17, 1998NOMINAL FREQUENCY : 2.450 MHz TESTED BY : K. UEDA*K. Ueda*

DESCRIPTION : (Unit Dimension : cm)

Cabinet Dimension : 42.2 by 54.0 by 33.5 Door Dimension : 42.2 by 25.6Oven Cavity Dimension : 33.0 by 33.0 by 23.0 Door Viewing area : 28.6 by 12.3Feed Type and Location : Waveguide, located top & bottom Stirrer : rotating antenna & trayDoor seal Type : Choke SealMagnetron Type : Sanyo 2M-232K(M)Others : N/A

TEST EQUIPMENT USED :

1. Antenna (Horn Antenna)

	<u>Frequency Range</u>	<u>Correction Factor</u>
AILTECH 91888-2	1.0 - 2.0 G Hz	21.5 - 22 dB
AILTECH 91889-2	2.0 - 3.6 G Hz	20.5 - 21 dB
AILTECH 94613-1	3.6 - 7.6 G Hz	37 dB
AILTECH 91891-2	7.3 - 10.0 G Hz	39.8 dB

Other Correction Factor

(a) Cable loss

<u>Frequency (M Hz)</u>	<u>Cable loss (dB)</u>
2,400	1.1
2,500	1.1
4,900	1.6
7,350	2.2
9,800	2.7

(b) Loss of Band Rejection Filter

<u>Frequency Range (G Hz)</u>	<u>Filter loss (dB)</u>
2.0 - 3.6	3.0

2. Field Strength Meter

AILTECH NM-67 (SER 0241-03088)

Last calibrated date : November 20, 1998

Setting : Bandwidth ----- 1 MHz

Function ----- Field Intensity (average value detector)

3. When measuring sidebands close to the fundamental, band reject filter Model 6N45-2450/60 (SER FK837-1) was employed.

REPORT OF MEASUREMENT (MICROWAVE OVEN TEST DATA SHEET B)

FCC ID : AEZA106 MODEL : EM-C60 DATE : December 17, 1998
 Nominal Frequency : 2,450 MHz TESTED BY : KUEDA

DATA SUMMERY (FCC MEASUREMENT PROCEDURE MP-5)

SAFETY CHECK (at 5 cm)
 FUNDAMENTAL

Load : 275 ml/center
 Load : 1,000 ml/center

0.04 mW/sq.cm
 2,454 MHz

CALCULATION : $E(300m) = K \times 10^{((A+B+C+D+E)/20)}$

* Note :

Location of load for the oven provided with the rotating tray is :
 Contiguous with the shelf circumference.

LIMIT = $25 \times \sqrt{\text{power}/500}$: 27.4 $\mu\text{V}/\text{m}$

RADIATION FIELD STRENGTH ($\mu\text{V}/\text{m}$ at 300 m)

	Load (ml)	Location of Load	Emission Frequency (MHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Filter Loss (dB)	Calcu. Factor (dB)	The Value of K ($E(300m) = K \times E(3m)$)	Max. Field Strength ($\mu\text{V}/\text{m}$ at 300m)	Limit ($\mu\text{V}/\text{m}$ at 300m)
2nd Harmonic	300	Center	4,910	9.0	37.0	1.6	—	5	0.0100	4.3	27.4
2nd Harmonic	300	* Right/Front Corner	5,001	8.9	37.0	1.6	—	5	0.0100	4.2	27.4
2nd Harmonic	700	Center	4,910	8.9	37.0	1.6	—	5	0.0100	4.2	27.4
2nd Harmonic	700	* Right/Front Corner	4,943	9.0	37.0	1.6	—	5	0.0100	4.3	27.4
3rd Harmonic	300	Center	7,848	12.2	39.8	2.2	—	5	0.0100	9.1	27.4
3rd Harmonic	300	* Right/Front Corner	7,860	12.3	39.8	2.2	—	5	0.0100	9.2	27.4
3rd Harmonic	700	Center	7,906	12.5	39.8	2.2	—	5	0.0100	9.4	27.4
3rd Harmonic	700	* Right/Front Corner	7,906	12.4	39.8	2.2	—	5	0.0100	9.3	27.4
4th Harmonic	700	Center	9,174	12.7	39.8	2.7	—	5	0.0100	10.2	27.4
Spurious	700	Center	2,367	26.0	20.8	1.1	3	5	0.0060	3.7	27.4
Emission Sideband 2,400 MHz	700	Center	2,400	14.5	20.8	1.1	3	5	0.0061	1.0	27.4
Emission Sideband 2,500 MHz	700	Center	2,500	14.0	19.0	1.1	3	5	0.0064	0.8	27.4

Maximum Frequency Variation 1,000 ml load

Total Power Input to Oven

Power Development in dummy load (Thermal Method)

Supply Voltage

2,454 to 2,454 M Hz.

1,100 Watts

600 Watts (IEC705 Test Procedure)

AC 120 V 60 Hz

1830 MHz - 2745 MHz

2745 MHz - 3660 MHz

3660 MHz - 4575 MHz

4575 MHz and above

$2.6230 \times 10^{(-3)}$ * frequency : GHz) -0.0002

$2.1858 \times 10^{(-3)}$ * frequency : GHz) +0.0010

$1.0929 \times 10^{(-3)}$ * frequency : GHz) +0.0050

0.0100

FCC ID : AEZA106 MODEL : EM-C60 DATE : December.17.1998

TESTED BY : K.UEDA

K. Ueda

Note : In order to convert the measured field strength at 3meters to the field at 300 meters, comply with FCC/OST MP-5 Appendix C "4.6.1 Computations to determine compliance". A calculation factor of 5 dB, this figure is fixed by SANYO, is introduced bfor adjusting a tolerance in measurement.
A calculation factor of 5 dB should be added to "METER READING" as shown in SAMPLE CALCULATION below.

SAMPLE CALUCULATION

(1) 2nd Harmonic with 300 ml/Center load

$$\begin{aligned}\text{Field Strength at 300 m} &= 0.0100 \times 10^{(9.0 + 37 + 1.6 + 5) / 20} \\ &= 4.3 \quad \text{uV/m}\end{aligned}$$

(2) Emission sideband 2,400 M Hz., 700 ml/Center load

$$\begin{aligned}\text{Field Strength at 300 m} &= 0.0061 \times 10^{(14.5 + 20.8 + 1.1 + 3 + 5) / 20} \\ &= 1.0 \quad \text{uV/m}\end{aligned}$$

Designated by Ministry of International Trade and Industry

Attachment #1C

KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

HEAD OFFICE
6-8-7, NISHITEMMA
KITA-KU, OSAKA, 530 JAPAN



IKOMA
TESTING LABORATORY
10630, TAKAYAMA-CHO
IKOMA-CITY, NARA, 630-01 JAPAN

*Corporate Juridical Person***ENGINEERING TEST REPORT**REPORT NO. A-047-98-C

Issued Date : January 20, 1999

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 18 Subpart C.

Partly the tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant

Company Name : SANYO Electric Co., Ltd. Home Appliance Business Headquarters
Microwave Oven Division

Mailing Address : 1-1, Seta, 1-chome, Otsu City, Shiga, 520-2198 Japan

2. Identification of Tested Device

FCC ID : AEZA106
Device Name : Commercial Use Microwave Oven
Trade Name : SANYO
Model Number : EM-C60
Serial Number : No.1
Date of Manufacture : December, 1998

3. Test Items and Procedure

1) Radiated Emission Measurement (30 MHz to 1000 MHz)

Above all tests were performed under : FCC/OET MP-5 (1985)

4. Date of Test

Receipt of Test Sample : December 17, 1998
Test Completed on : January 14, 1999

CERTIFIED BY :

Fumitoshi Nagaoka

Associate Director of Ikoma Testing Laboratory

ENGINEERING TEST REPORT**Attachment #1C**TABLE OF CONTENTS**1. GENERAL INFORMATION**

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1.2 Description for Equipment Authorization	3
1.3 Test Facility	3

2. TESTED SYSTEM

2.1 Test Mode	4
2.2 Operation of EUT System	4
2.3 Block Diagram of EUT System	4

3. MEASUREMENT OF ELECTRIC FIELD STRENGTH (30 MHz TO 1000 MHz)

3.1 Reference Rule and Specification	5
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3.3 Test Arrangement	6
3.4 Photographs of EUT System Configuration	7
3.5 Test Results	8
3.6 List of Test Instruments	9

ENGINEERING TEST REPORT**1. GENERAL INFORMATION****1.1 Product Description**

The SANYO Model No. EM-C60(referred to as the EUT in this engineering test report) is a Commercial Use Microwave Oven.

1) Special Feature

- Magnetron Frequency : 2.45 GHz $\pm$ 50 MHz
- Input Power : 1100 W
- RF Power : 600 W

2) Rated Power Supply

- AC 120 V, 60 Hz, 1100 W
- Protection Class 1(with ground connector)

3) Contained Oscillator

- 4 $\pm$ 0.4 MHz

1.2 Description for Equipment Authorization**1) Rules Part(s) under which equipment operated**

FCC Rule Part 18, Subpart C
ISM Equipment

2) Kind of Equipment Authorization

(x) Certification () Verification

3) Procedure of Application

(x) Original Equipment () Modification

1.3 Test Facility

N a m e : KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER(KEC)
IKOMA TESTING LABORATORY
Open Test Site No.2

Address : 10630, Takayama-cho Ikoma-city, Nara, 630-0101 Japan

These test facilities have been filed with the FCC under the criteria of
ANSI C63.4-1992

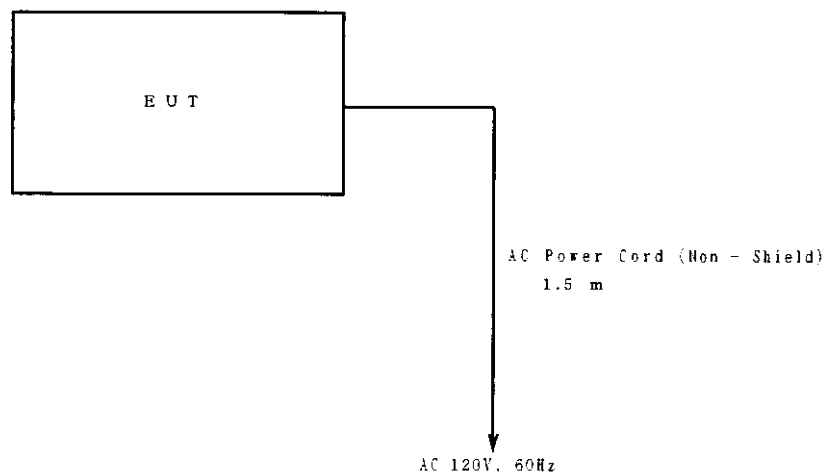
ENGINEERING TEST REPORT**Attachment #1C****2. TESTED SYSTEM****2.1 Test Mode**

The compliance tests were performed under following operation mode.

Maximum Output Power Operation

2.2 Operaton of EUT System

- 1) Open the door of EUT.
- 2) Set the load as follows in EUT.
 - Receptacle
1000 cc volume Beaker
 - Load for the test
700 cc water with beaker
- 3) Close the door of EUT.
- 4) Set the output power to maximum.
- 5) Set the cooking time.
- 6) Push the start pad.
Then start the cooking.

2.3 Block Diagram of EUT System

ENGINEERING TEST REPORT**Attachment #1C****3. MEASUREMENT OF ELECTRIC FIELD STRENGTH (30 MHz TO 1000 MHz)****3.1 Reference Rule and Specification**

FCC Rule Part 18 Subpart C
FCC/OET MP-5(1985)

3.2 Test Procedure**1) Configure the EUT.**

[See 3.3 Test arrangement and 3.4 Photographs of EUT System Configuration]

[Note]

The power cords for the EUT are connected through the receptacle with the turn floor to the CVCF placed under the ground plane.

2) Operate the EUT.**3) To determine the emissions of the EUT, preliminary radiated measurement was performed at a closer distance than that specified for final radiated measurement using the broad band antenna and the spectrum analyzer.****4) To search the frequency of maximum emission level on the spectrum analyzer, change the EUT System configuration, move the signal cables and the power cords, change the EUT conditions.****5) The spectrum was scanned from 30 MHz to 1000 MHz and collect the emissions on the spectrum analyzer.****6) The collected emissions for final test were measured at the specified distance using the tuned dipole antenna or broad band antenna and the test receiver *1).****[Note]*****1) Test Receiver Operation Mode**

Detector Function : Average

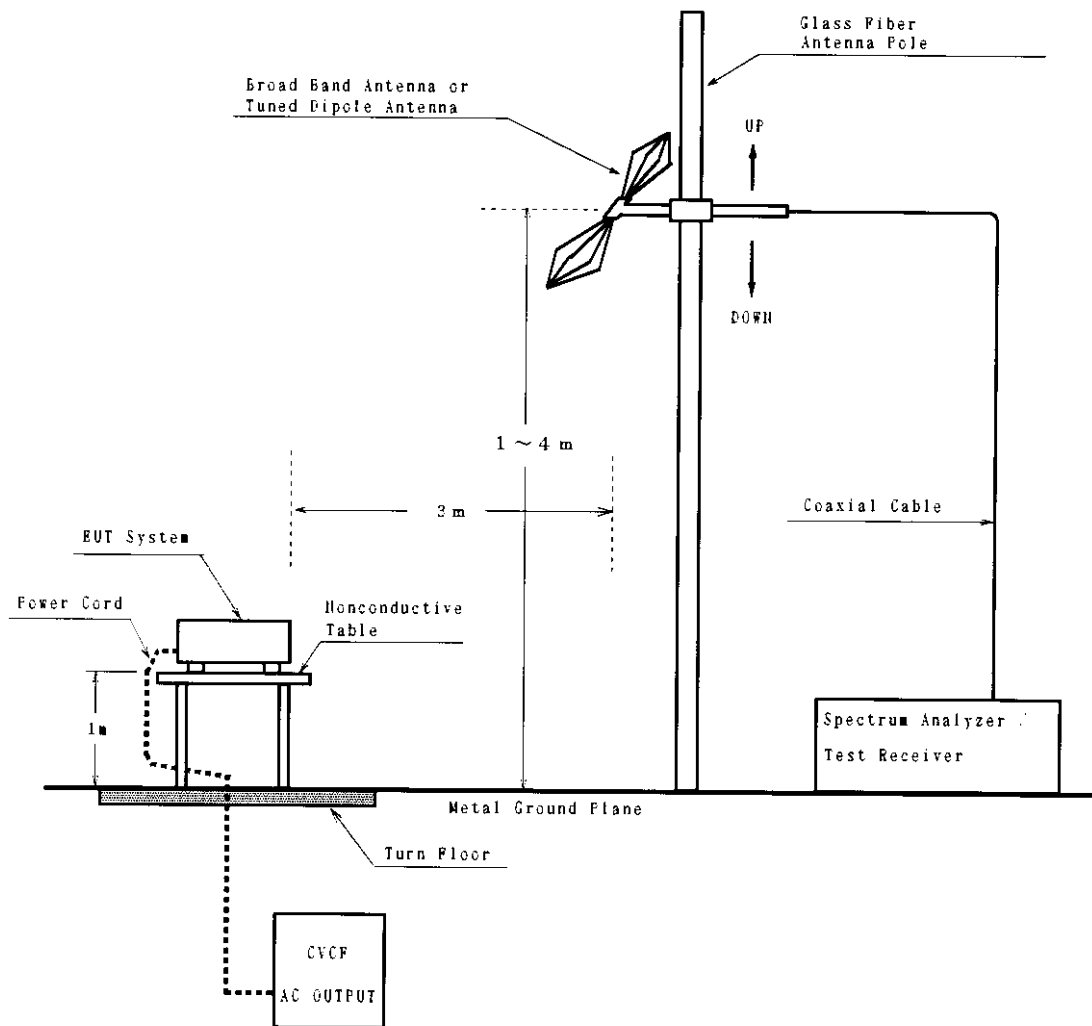
IF Band Width : 120 kHz(frequency range in 30 MHz - 1000 MHz)

ENGINEERING TEST REPORT

Attachment #1C

3.3 Test Arrangement

[Open Site]



ENGINEERING TEST REPORT

Attachment #1C

3.5 Test Results

Emission Frequency [MHz]	Antenna Factor [dB]	Meter Reading at 3 m [dB μ V]		Maximum Field Strength at 300 m [μ V/m]	Limits [μ V/m]
		Horiz.	Vert.		
68.1	9.9	<-10.0	<-10.0	<0.1	27.4
100.0	12.6	<-10.0	<-10.0	<0.1	27.4
300.0	18.3	<-10.0	<-10.0	<0.1	27.4
682.0	27.4	<-10.0	<-10.0	<0.1	27.4
700.0	27.8	<-10.0	<-10.0	<0.1	27.4
900.0	30.6	<-10.0	<-10.0	<0.1	27.4

[Note]

Distance Corr. Factor : -40 dB(from 3 m to 300 m)
 Antenna Factor : Antenna Factor includes the cable loss
 Test Condition : 700 ml water load, at the center of tray.
 Limits : $25\sqrt{P/500} = 25\sqrt{600/500} = 27.4[\mu\text{V/m}]$
 P[W] : RF(Microwave) Power

[Environment]

Temperature : 20 °C Humidity : 57 %

[Sample Calculation]

Frequency 900.0 MHz, Horizontal Polarization

Field Strength (μ V/m at 300 m)

$$\begin{aligned}
 &= 10^{(\text{Meter Reading [dB } \mu\text{V]} + \text{Antenna Factor [dB]} + \text{Distance Corr.Factor [dB]})/20} \\
 &= 10^{(-10.0 + 30.6 - 40)/20} \\
 &= 10^{(-19.4/20)} \\
 &= < 0.1 [\mu\text{V/m}]
 \end{aligned}$$

[Summary of Test Result]

Minimum margin was more than 48.8 dB at 900.0 MHz (Horizontal Polarization).

Tested Date : January 14, 1999

Signature

Y. Kawai
Yasunari Kawai

ENGINEERING TEST REPORT

3.6 List of Test Instruments

Instrument	Manufacturer	Model No	Specifications	KEC Control No.	If used, checked by "X".	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESVP	Frequency Range 20 MHz - 1000 MHz	FS-48-3	☒	1998/5	1999/5
		ESV	Frequency Range 20 MHz - 1000 MHz	FS-53	☐	1998/4	1999/4
Spectrum Analyzer	Advantest	TR4172	Frequency Range 50 Hz - 1.8 GHz	FS-44-2	☒	1998/9	1999/9
Pre-Selector	Advantest	TR14037	Frequency Range 10 kHz - 1.0 GHz	FS-44-3	☒	1998/9	1999/9
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30 MHz - 300 MHz	AN-80	☒	1998/2	1999/2
Log-Periodic Antenna	Schwarzbeck	UHALP 9107	Frequency Range 300 MHz - 1 GHz	AN-97	☒	1998/2	1999/2
Tuned Dipole Antenna	Kyoritsu	KBA-511S	Frequency Range 25 MHz - 500 MHz	AN-112	☐	1998/3	1999/3
		KBA-611S	Frequency Range 500 MHz - 1 GHz	AN-7-11	☐	1998/3	1999/3

REPORT OF MEASUREMENT (MICROWAVE OVEN TEST DATA)

- Measurement of Frequency VS Line Voltage Stability -

FCC ID : AEZA106 Model : EM-C60 Date : December.17.1998

Nominal Frequency : 2,450 MHz

Tested by : K.Ueda

K. Ueda

Line Voltage Variation [Volt]	Frequency [GHz]	Deviation for ISM Frequency [MHz]	Limit [MHz]
96 (- 20%)	2.451	+1	± 50
120 (± 0%)	2.454	+4	± 50
150 (+ 25%)	2.452	+2	± 50

[Environment]

Temperature : 22.0 °C

Humidity : 66 %

[Sample Calculation]

Frequency : 2.454 GHz

Deviation for ISM Frequencies Calculated as follows,

$$2.454 - 2.4500 = \underline{0.004} \text{ [GHz]} = \underline{4} \text{ [MHz]}$$

[Summary of Test Results]

Above data shows that the test device do / do not complies with the requirements.