FCC TEST REPORT

for

PART 18, SUBPART C

Equipment	:	Induction Cooker
Model No.	:	SR-1151F-1P
FCC ID	:	LFU00000002
Filing Type	:	Certification
Applicant	:	**Sunpentown Electric Co., Ltd.** No. 13, Gong Jain S. Rd., Keelung, Taiwan, R.O.C.

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Table of Contents

History of this test report ii
CERTIFICATE OF COMPLIANCE 1
1. General Description of Equipment under Test 2
1.1. Applicant 2
1.2. Manufacturer 2
1.3. Basic Description of Equipment under Test 2
1.4. Feature of Equipment under Test 2
2. Test Configuration of Equipment under Test 3
2.1. Test Manner 3
2.2. Description of Test System 3
3. EUT OPERATION CONDITION 4
4. General Information of Test 5
4.1. Test Facility 5
4.2. Standard for Methods of Measurement 5
4.3. Test in Compliance with 5
4.4. Frequency Range Investigated 5
4.5. Test Distance 5
5. Test of Conducted Powerline 6
5.1. Major Measuring Instruments 6
5.2. Test Procedures 7
5.3. Typical Test Setup Layout of Conducted Powerline 8
5.4. Test Result of AC Powerline Conducted Emission 9
6. Test of Radiated Emission 10
6.1. Major Measuring Instruments 10
6.2. Test Procedures 11
6.3. Typical Test Setup Layout of Radiated Emission 12
6.4. Test Result of Radiated Emission 13
7. EMI Suppression Component List 14
8. Cable Loss 15
9. List of Measuring Equipments Used 16
10. Uncertainty of Test Site 17
Appendix A. Photographs of EUT ..... A1 ~ A8

History of this test report

Original Report Issue Date: Oct. 09, 2002

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F1N2201

CERTIFICATE OF COMPLIANCE

for

PART 18, SUBPART C

Equipment	:	Induction Cooker
Model No.	:	SR-1151F-1P
FCC ID	:	LFU00000002
Applicant	:	**Sunpentown Electric Co., Ltd.** No. 13, Gong Jain S. Rd., Keelung, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurement shown in this report were made in accordance with the procedures given in **FCC/OET MP-5 (1986)** and the energy emitted by this equipment was ***passed*** both radiated and conducted emissions **Class B** limits. Testing was carried out on Oct. 03, 2002 at **SPORTON International Inc.** LAB.

K. J. Lin Oct. 25, 2002

K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

Sunpentown Electric Co., Ltd.
No. 13, Gong Jain S. Rd., Keelung, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	: Induction Cooker
Model No.	: SR-1151F-1P
FCC ID	: LFU00000002
Trade Name	: Sunpentown
Power Supply Type	: Switching
AC Power Cord	: Non-Shielded, 1.7m, 3 pin

1.4. Feature of Equipment under Test

Voltage	120V, 50/60Hz
Power	400W
Dimension	340.4 x 320 x 83.8mm
Weight	5.5kg
Output range	200 ~ 400W

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT pursuant to FCC/OET MP-5 (1986) and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.

b. Frequency range investigated: Conduction 10 KHz to 30 MHz, Radiation 9 KHz to 30 MHz.

2.2. Description of Test System

There is only a test equipment on the table. No support unit was needed while testing.

3. EUT OPERATION CONDITION

1. Turn on the power of the INDUCTION WOKTOP (EUT).
2. Choose the EUT operation switch to “WARM” mode.
3. Adjust the temperature setting to maximum.
4. Change the EUT operation switch to “COOK” mode.
5. Adjust the temperature setting to maximum.

4. General Information of Test

4.1. Test Facility

Test Site Location	:	No. 3, Lane 238, Kang Lo Street, Nei Hwu District, Taipei 11424, Taiwan, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
Test Site No	:	CN01, ON03

4.2. Standard for Methods of Measurement

FCC/OET MP-5 (1986)

4.3. Test in Compliance with

FCC PART 18, SUBPART C

4.4. Frequency Range Investigated

a. Conduction : from 10 KHz to 30 MHz
b. Radiation : from 9 KHz to 30 MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 10M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 10 KHz to 30 MHz with a bandwidth of 9 KHz for 150KHz to 30MHz and 200Hz for 10KHz to 150KHz on the 110VAC power and return leads of the EUT according to the methods defined in FCC/OET MP-5(1986). The EUT was placed on a nonmetallic stand in a shielded room 0.4 meters above the ground plane as shown in Section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

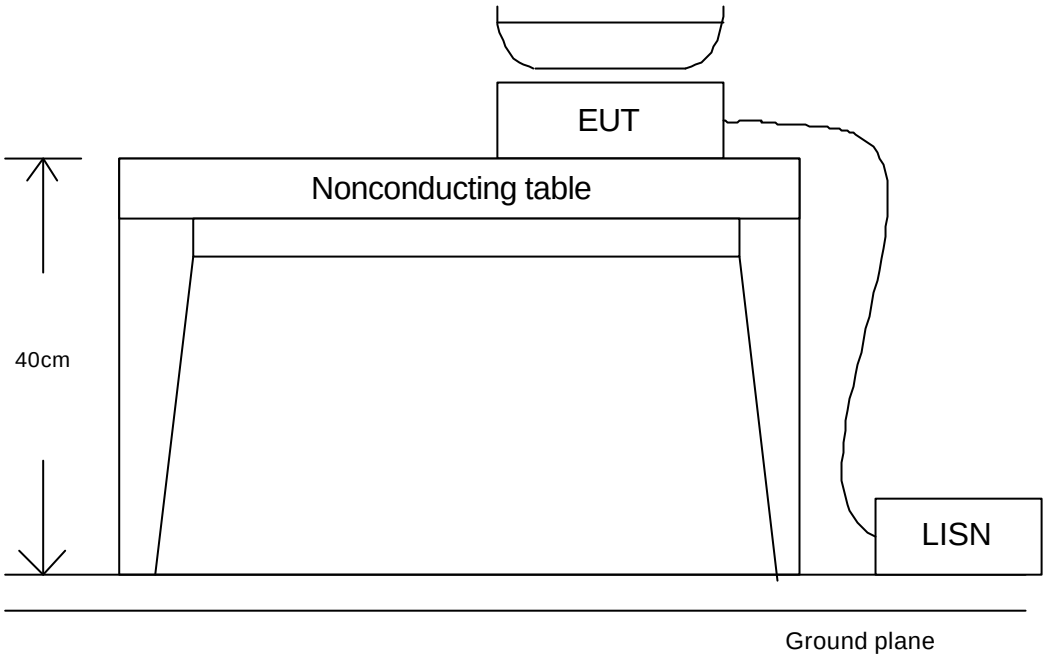
5.1. Major Measuring Instruments

● Test Receiver	(R&S ESH3)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

5.2. Test Procedures

a. The EUT was connected to power mains (110VAC/60Hz) through a line impedance stabilization network (LISN). This provides 50 ohm coupling impedance for the measuring instrument. The FCC states that a 50 ohm, 5 micro Henry LISN should be used, Both sides of AC line were checked for maximum conducted interference.

5.3. Typical Test Setup Layout of Conducted Powerline



5.4. Test Result of AC Powerline Conducted Emission

- Frequency Range of Test : from 10 KHz to 30 MHz
- Temperature : 23°C
- Relative Humidity : 52 %
- Test Date : Oct. 03, 2002

The Conducted Emission test was passed at minimum margin LINE 0.708 MHz / 44.50 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading (dBuV)	Meter Reading (uV)	Limits (dBuV)	Limits (uV)	Margin (dB)
0.141	L	46.20	204.17	60.00	1000.00	-13.80
0.181	L	55.20	575.44	60.00	1000.00	-4.80
0.708	L	44.50	167.88	48.00	251.19	-3.50
9.107	L	37.20	72.44	48.00	251.19	-10.80
14.464	L	39.20	91.20	48.00	251.19	-8.80
13.351	L	37.50	74.99	48.00	251.19	-10.50
0.035	N	59.60	954.99	79.49	9435.12	-19.89
0.150	N	42.10	127.35	60.00	1000.00	-17.90
0.715	N	41.80	123.03	48.00	251.19	-6.20
0.672	N	42.50	133.35	48.00	251.19	-5.50
6.437	N	27.70	24.27	48.00	251.19	-20.30
9.437	N	28.90	27.86	48.00	251.19	-19.10

Test Engineer : Samuel

Samuel Chang

6. Test of Radiated Emission

Radiated emissions from 9KHz to 30MHz were measured with a bandwidth of 9 KHz for 150KHz to 30MHz and 200Hz for 9KHz to 150KHz according to the methods defines in FCC/OET MP-5 (1986). The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in Section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Major Measuring Instruments

• Test Receiver	(R&S ESEC30)
Resolution Bandwidth	120 KHz
Frequency Band	9 K – 2.75 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode
	OFF for Peak Mode

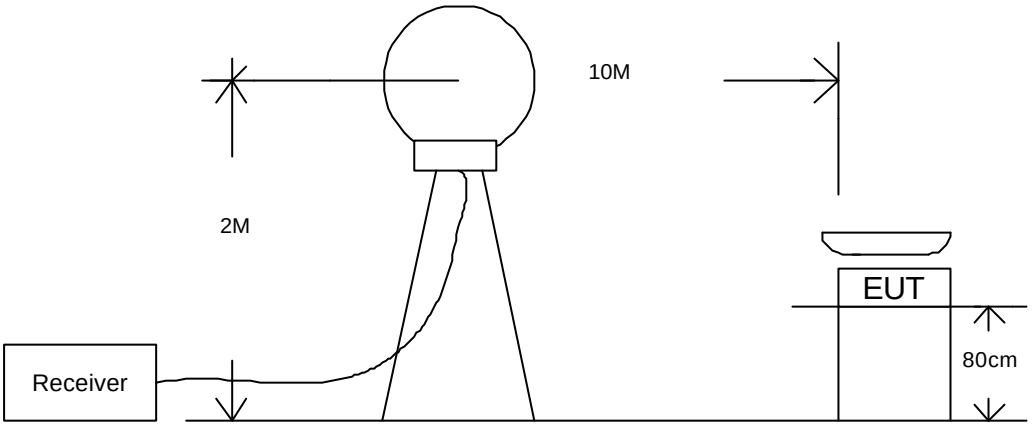
Note: 1. For the EUT operating frequency below 1.705MHz, the frequency rang of measurement which is according to the Commission rule 18.309 is from 9KHz to 30MHz.

2. Distance refers to the distance in meters between the measuring antenna and the closet point of EUT.

6.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a Loop Ant and its height is two meter above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

6.4.1. Test Mode: Mode 1

- Test Distance : 10 M
- Temperature : 25°C
- Relative Humidity : 59 %
- Test Date : Oct. 03, 2002
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin
0.658 MHz / 70.10 dBuV/m (VERTICAL) Antenna Height 2 Meter, Turntable Degree 60 ^{o}.

Frequency (MHz)	Polarity	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)
0.038	H	0.001	71.00	73.10	4519	71.00	3548.13	-2.10
0.077	H	0.020	45.38	73.10	4519	45.40	186.21	-27.70
0.107	H	0.100	42.20	73.10	4519	42.30	130.32	-30.80
0.150	H	0.100	53.00	73.10	4519	53.10	451.86	-20.00
0.038	V	0.10	48.80	73.10	4519	48.90	278.61	-24.20

Test Engineer :
LOUIS LIN

7. EMI Suppression Component List

1. Add a ferrite core on power output.
   (As the Internal photo No.2)

8. Cable Loss

Frequency (MHz)	Cable Loss (dB)
0.009	0.001
0.012	0.001
0.04	0.001
0.05	0.02
0.1	0.1
0.2	0.1
0.3	0.04
0.4	0.04
0.5	0.02
0.7	0.06
1	0.1
2	0.1
3	0.16
4	0.2
5	0.2
6	0.2
7	0.2
8	0.2
9	0.2
10	0.2
15	0.3
20	0.4
25	0.3
30	0.3

Remark : The R&S test receiver will automatically offset the antenna factor, therefore, the reading value shown on the R&S test receiver is included receiving value added antenna factor.

9. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
LISN	Rolf Heine	NNB-2/16Z	99041	50uH / 50 ohm	Mar. 26, 2002	Conduction (CN01)
LISN	KYORITSU	KNW-407	8-1010-15	50uH / 50 ohm	Nov. 28, 2001	Conduction (CN01)
Power Filter	CORCOM	MR12030	N/A	30A*2	N/A	Conduction (CN01)
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30 MHz	Jul. 31, 2002	Conduction
Spectrum Monitor	R&S	EZM	894987/011	9KHz – 1.3GHz	Jul. 31, 2002	Conduction
Receiver	R&S	ESCS30	838251/002	9 K – 2.75 GHz	Nov. 28, 2001	Radiation (ON03)
Loop Antenna	R&S	HFH2-Z2.335.4711.52	860004/001	9KHz – 30MHz	Jun. 22, 2002	Radiation (ON03)
Turn Table	EMCO	2080	9805-2065	0 ~ 360 degree	N/A	Radiation (ON03)
Antenna Mast	EMCO	2075	9804-2151	1 m - 4 m	N/A	Radiation (ON03)

※ Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	**normal**	**±1.66**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±3.32**

$U=\sqrt{\{(0.3/2)^2+(2^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.66$

Uncertainty of Radiated Emission Measurement

Contribution	**Probability Distribution**	3m	10m
Antenna factor calibration	normal(k=2)	±1.6	±1.6
cable loss calibration	normal(k=2)	±0.3	±0.3
RCV/SPA specification	rectangular	±3	±3
Antenna Directivity	rectangular	±3	±0.5
Antenna Factor V.S. Height	rectangular	±2	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25	±0.25
site imperfection	rectangular	±2	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54	±0.54
combined standard uncertainty Ue(y)	**normal**	**±3.1**	**±2.6**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±6.2**	**±5.2**

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.6$ for 10m test distance

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=3.1$ for 3m test distance