

EMI TEST REPORT

Test Report No. : 22EE0011-YW

Applicant: Sony Corporation

Type of Equipment: Notebook Computer (Wireless LAN built in PC)

Model No.: PCG-631L

FCC ID: AK8PCG631L

Test standard: FCC Part15 Subpart C, Section 15.247

Test Result: Complied

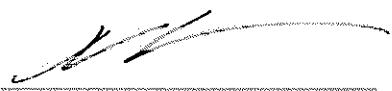
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The results in this report apply only to the sample tested.

Date of test: December 17 and 20, 2001

Issued date: January 15, 2002

Revised data: January 29, 2002

Tested by: 

Naoki Sakamoto

Group Leader of EMC section

Approved by: 

Kazutoyo Nakanishi

Site Operation Manager of EMC section

A-pex International Co., Ltd.
YOKOWA LAB.

108 Yokowa-cho, Ise-shi, Mie-ken . 516-1106 JAPAN

Telephone: int +81 596 39 1485

Facsimile: int +81 596 39 0232

Table of Contents	Page
1 GENERAL INFORMATION	3
1.1 Tested Methodology	4
1.2 Test Facility	4
2 PRODUCT DESCRIPTION	5
2.1 Test system Details	5
3 SYSTEM TEST CONFIGURATION	6
3.1 Justification	6
3.2. Configuration of Tested System	6
4 MEASUREMENT UNCERTAINTY	7
5 TEST INSTRUMENTS	8
6 SUMMARY OF TEST	9
6.1 §15.207 Conducted Emissions	9
6.2 §15.247(a)(2)6dB Bandwidth	9
6.3 §15.247(b) Maximum Peak Out Put Power(Radiated and Conducted)	10
6.4 §15.247(c) Out of Band Emissions(Radiated)	11
6.5 §15.247(c) Out of Band Emissions(Conducted)	11
6.6 §15.247(d) Power Density(Conducted)	12
6.7 §15.247(e) Processing Gain	12
Photographs of test setup	13-14
APPENDIX	15
Test data	A1toA30

1 GENERAL INFORMATION

APPLICANT : Sony Corporation

ADDRESS : 6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo
141-0001 Japan
TEL : 81-3-5795-8716
FAX : 81-3-5795-8981

REGULATION(S) : FCC Part15 Subpart C, Section 15.247

MODEL NUMBER : PCG-631L

SERIAL NUMBER : 004 (Radiated and AC Main Conducted Emissions tests)

KIND OF EQUIPMENT : Notebook Computer (Wireless LAN built in PC)

TESTED DATE : December 17 and 20, 2001

RECEIPT DATE OF SAMPLE : December 17, 2001

REPORT FILE NUMBER : 22EE0011-YW

TEST SITE : A-PEX Yokowa No.3 Open Test Sites

Test report

FCC ID : AK8PCG631L

Our reference : 22EE0011-YW

Page : 4 of 15

Issued date : January 15, 2002

Revised data : January 29, 2002

1.1 Tested Methodology

The measurement was performed according to the procedures in ANSI C63.4(1992).

1.2 Test Facility

The open area site measurement facilities used to collect the radiated data are located at 108, Yokowa-cho, Ise-shi, Mie-ken, 516-1106 Japan.

These sites have been fully described in reports submitted to the FCC office.

No.1 and No.3 test site has filed to the FCC on September 12, 2000 as number: 90412 and is accepted by Industry Canada on May 01, 2001 as number IC2973-3.

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YOKOWA LAB.

108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN

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2 PRODUCT DESCRIPTION

Sony Corporation, Model PCG-631L (referred to as the EUT in this report) is a Notebook Computer.
The specification is as following :

LAN Module

Frequency characteristics : 2412MHz through 2462MHz
No. of channels / channel spacing : 11 channels / 5MHz channel spacing
Modulation : DSSS:Direct sequence spread spectrum.(IEEE 802.11b)
Antenna type : lambda/4 monopole antenna (Integral)
Antenna Gain : 2.14dBi (Peak)
I/F : mini-PCI card

*FccPart15.31(e)

The host device PCG-631L provide the LAN Module with stable power supply(DC:3.3V), and the LAN Module complies power supply regulation.

*FccPart15.203 Antenna requirement

Wireless LAN Module and its antenna comply with this requirement since they are built in host device PCG-631L when they are put up for sale and they are used with a particular antenna connector.

2.1 Test System Details

Model	FCC ID	Description
(1)Sony Corporation M/N: PCG-631L S/N: 004 (Radiated and AC Main Conducted Emissions tests)	AK8PCG631L	Notebook Computer (Wireless LAN built in PC)
*FccPart15 Subpart B Class B Digital Device : DOC		
(2) Sony Corporation M/N: PCGA-AC16V3 S/N: 0110 A 0000069P (Radiated and AC Main Conducted Emissions tests) 0110 A 0000048P (Antenna connector Conducted tests)	DOC	AC Adapter

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YOKOWA LAB.

108 Yokowa-cho, Ise-shi, Mie-ken 516-1106 JAPAN

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Facsimile: int +81 596 39 0232

3 SYSTEM TEST CONFIGURATION

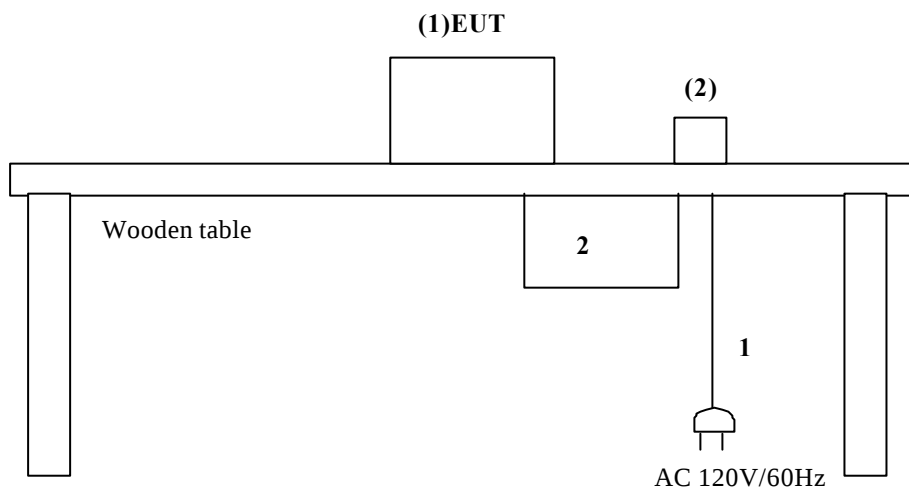
3.1 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode : Transmitting mode

Performed the test about channels 1(low), 6(mid) and 11(high) among 11 channels of all Carrier frequencies.

3.2 Configuration of Tested System



* Cabling was taken into consideration and test data was taken under worst case conditions.

List of cables used

No.	Name	Length (m)	Shield	Remark
1	AC Power Cable	0.75	N	Polyvinyl chloride
2	DC Power Cable	2.0	N	Polyvinyl chloride

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Test report

FCC ID : AK8PCG631L

Our reference : 22EE0011-YW

Page : 7 of 15

Issued date : January 15, 2002

Revised data : January 29, 2002

4 Measurement Uncertainty

Conducted Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ± 2.0 dB.

The data listed in this test report has enough margin, more than 2.0dB.

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.4 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 4.8 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ± 5.8 dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

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Test report**FCC ID : AK8PCG631L****Our reference : 22EE0011-YW****Page : 8 of 15****Issued date : January 15, 2002****Revised data : January 29, 2002**

5 TEST EQUIPMENT USED

Name	Manufacturer	Model	Control No.	Calibrated Until
Pre Amplifier	Hewlett Packard	8447D	AF-01	March 30, 2002
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 3, 2002
Attenuator	Anritsu	MP721B	AT-06	March 30, 2002
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	April 30, 2002
Horn Antenna	A.H.Systems	SAS-200/571	HA-01	May 19, 2002
Horn Antenna	Schwarzbeck	BBHA9170	EST-10	October 16, 2004
Logperiodic Antenna	Schwarzbeck	UKLP9140-A	LA-06	April 30, 2002
LISN	Schwarzbeck	NSLK8126	LS-04	November 5, 2002
Spectrum Analyzer	Hewlett packard	8567A	SA-04	March 30, 2002
Spectrum Analyzer	Advantest	R3273	SA-06	November 19, 2002
Test Receiver	Rohde & Schwarz	ESHS30	TR-05	August 23, 2002
Test Receiver	Rohde & Schwarz	ESVS10	TR-06	November 21, 2002
Power Sensor	Hewlett packard	ECP-E18A	PS-01	May 28, 2002
Power Meter	Hewlett packard	EPM-442A	PM-01	May 28, 2002

All measurement equipment is traceable to national standards.

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6 SUMMARY OF TESTS

6.1 §15.207 Conducted Emissions

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flush with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, were individually connected through a LISN to the input power source. All unused 50 ohm connectors of the LISN were resistively terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements have been performed with a CISPR quasi-peak detector (IF BW 10kHz).

(Measurement range : 450kHz to 30MHz)

Test data : APPENDIX A1 to A6
Photographs of test setup : Page 14(1)
Test result : Pass
Test instruments : LS-04, SA-04, TR-05

6.2 § 15.247(a)(2) 6dB Bandwidth

Test Procedure

The minimum 6dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

1. 2412MHz(Low) : 7.28MHz > 500kHz
2. 2437MHz(Mid) : 6.48MHz > 500kHz
3. 2462MHz(High) : 6.46MHz > 500kHz

Test data : APPENDIX A7
Test result : Pass
Test instruments : SA-06

6.3 § 15.247(b) Maximum Peak Out Put Power

Radiated : Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Test data : APPENDIX A8 to A11
Photographs of test setup : Page15(2)
Test result : Pass
Test instruments : SA-06, HA-01, AF-04

Conducted:Test Procedure

The Maximum Peak Output power was measured with a power meter connected to the antenna port.

* Antenna Gain dose not exceed 6dBi.

Test data : APPENDIX A12
Test result : Pass
Test instruments : PS-01, PM-01, SA-06

6.4 § 15.247(c) Out of Band Emissions(Radiated)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Radiated Spurious emissions

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement. The result was also satisfied the general limits specified in Sec.15.209(a).

Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz
: 1GHz to 26GHz PK and AV Detector

Test data : APPENDIX A13 to A15 (30 –1000MHz)
: APPENDIX A16 to A18(1 – 26GHz)
: APPENDIX A27 to A30(2390MHz/2483.5MHz, Restricted band Charts)

Photographs of test setup : Page14(2)

Test result : Pass

Test instruments : AF-01, AF-04, BA-03, LA-06, HA-01, SA-04, SA-05, TR-06

6.5 § 15.247(c) Out of Band Emissions(Conducted)

Test Procedure

The Out of Band Emissions(Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX A19 to A24

Test result : Pass

Test instruments : SA-06

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Test report
FCC ID : AK8PCG631L
Our reference : 22EE0011-YW
Page : 12 of 15
Issued date : January 15, 2002
Revised data : January 29, 2002

6.6 § 15.247(d) Power Density(Conducted)

Test Procedure

The Power Density was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX A25 to A26
Test result : Pass
Test instruments : SA-06

6.7 §15.247(e) Processing Gain Requirement

Test data : See attached test report No.
LucFCC ProcGain AddInformation 30May01.doc
015127a_Spr_gainHighSpeed_HS_.doc
Spr_gainFCC_HSI3E(012527a) Number2.xls
Test result : Pass

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Test report

FCC ID : AK8PCG631L

Our reference : 22EE0011-YW

Page : 13 of 15

Issued date : January 15, 2002

Revised data : January 29, 2002

Photographs of test setup(1)



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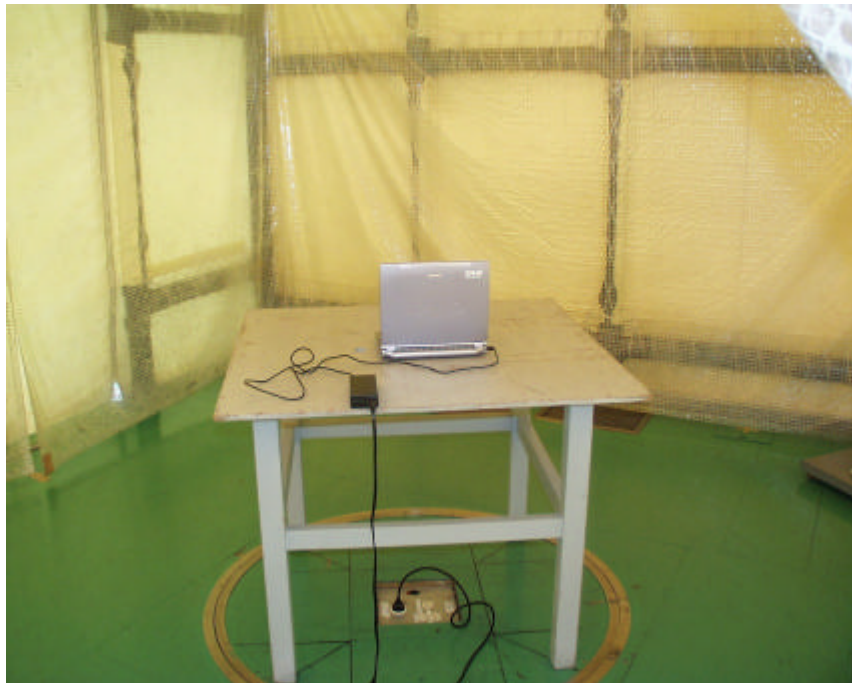
Our reference : 22EE0011-YW

Page : 14 of 15

Issued date : January 15, 2002

Revised data : January 29, 2002

Photographs of test setup(2)



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APPENDIX

Test Data

1. Conducted Emission (6.1)	<u>A1 to A6</u>
2. 6dB Bandwidth (6.2)	<u>A7</u>
3. Maximum peak output power (6.3)	<u>A8 to A12</u>
4. Out of band emissions(Radiated) (6.4)	<u>A13 to A18</u>
5. Out of band emissions(Conducted) (6.5)	<u>A19 to A24</u>
6. Power density (6.6)	<u>A25 to A26</u>
7. 2390MHz/2483.5MHz, Restricted band Charts (6.4)	<u>A27 to A30</u>