

EMISSION TEST REPORT

Test Report No. : 21AE0018YW-1

Applicant: Sony Corporation

Type of Equipment: Wireless LAN Card

Model No.: ERA-201D1

Test standard: Fcc Part15 Subpart C, Section 15.247

Test Result: Complies

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

September 20, 21 and 23, 2000

Date of test: November 1 and 2, 2000 Issued date: November 2, 2000

Tested by:



Naoki Sakamoto

Approved by:



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1 GENERAL INFORMATION

APPLICANT : Sony Corporation

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Tokyo 141-0001 Japan
Tel: +81-3-5777-5840
Fax: +81-3-5777-7909

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

MODEL NUMBER : ERA-201D1

SERIAL NUMBER : 1001

KIND OF EQUIPMENT : Wireless LAN Card

TESTED DATE : September 20,21 and 23, 2000
: November 1 and 2, 2000

RECEIPT DATE OF SAMPLE : September 19, 2000

REPORT FILE NUMBER : 21AE0018YW-1

TEST SITE : A-PEX Yokowa No. 2 and 3 Open Test Sites

Test report**FCC ID** : AK8ERA-201D1**Our reference** : 21AE0018YW-1**Page** : 4 of 17**Issued date** : 2000-11-02

1.1 Tested Methodology

The measurement was performed according to the procedures in FCC/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.2 test site has filed to the FCC on October 26, 2000 as number: 90411 and is accepted by Industry Canada on February 19, 1998 as number IC2973-2.

No.3 test site has filed to the FCC on September 12, 2000 as number: 90412 and is accepted by Industry Canada on February 19, 1998 as number IC2973-3.

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2 PRODUCT DESCRIPTION

Sony Corporation, Model ERA-201D1 (referred to as the EUT in this report) is a Wireless LAN Card.

The specification is as following :

Clock frequency	: 704MHz VCO (for upmixer)
	: 2050-2150MHz VCO (for upmixer)
	: 22MHz (for DSP)
Carrier frequency	: Direct sequence spread spectrum.
	2412 through 2462MHz (11channels / each 5MHz wide)
	* Integral Antenna.(Antenna Gain: -3.6dBi)
Operation Voltage	: DC 3.3V
I/F	: PCMCIA-bus

2.1 Test System Details

Model	FCC ID	Description
① Sony M/N: ERA-201D1 S/N: 1001 (EUT)	AK8ERA-201D1	Wireless LAN Card
② Sony M/N: PCG-C1XG S/N:1107155	DOC	Notebook Computer
③ Sony M/N:PCGA-AC5N S/N: 0060941	DOC	AC Adaptor
④ Sony M/N: PCGA-UFD5 S/N:2027779	DOC	Floppy Disk Drive

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<u>Model</u>	<u>FCC ID or DOC</u>	<u>Description</u>	<u>Cable description</u>	<u>Backshell Material</u>
(1) Sony M/N:ERA-201D1 (EUT) S/N:1001	N/A	Wireless LAN Card	-	-
(2) Sony M/N:PCG-C1XG S/N:1107155	DOC	Notebook Computer	Unshielded DC Cable	P.V.C.
(3) Sony M/N:PCGA-AC5N S/N:0060941	DOC	AC Adapter	Unshielded AC Cable	P.V.C.
(4) Sony M/N:DCR-PC100 S/N:157422	N/A	DV Camcorder	Shielded DV Cable Unshielded DC Cable	P.V.C. P.V.C.
(5) Sony M/N:AC-VQ800 S/N:21451028	N/A	AC Adapter	Unshielded AC Cable	P.V.C.
(6) Sony M/N:CPD-M151 S/N:4515785	DOC	LCD Display	Unshielded DC Cable Shielded VGA Cable	P.V.C. P.V.C.
(7) Sony M/N:AC-L200 S/N:C712506110	DOC	AC Adapter	Unshielded AC Cable	P.V.C.
(8) Sony M/N:PCGA-UMS1 S/N:00500125	DOC * for Radiated emission.	USB Mouse	Shielded USB Mouse Cable	P.V.C.
(8) Logitech M/N:M-UB48 S/N:LZA84550287 * for Conducted emission.	DZL211137	USB Mouse	Shielded USB Mouse Cable	P.V.C.
(9) Sony M/N:ECM-717 S/N:-	N/A	Microphone	Shielded Microphone Cable	P.V.C.
(10) Sony M/N:MDR-ED238ML S/N:-	N/A	Stereo Headphone	Shielded Stereo Headphone Cable	P.V.C.
(11) Victor M/N:HC-T500P S/N:-	N/A	Telephone Switcher	Unshielded Telephone Switcher Cable	P.V.C.
(12) Sony M/N:PCGA-DA1 S/N:-	N/A	Display Adapter	Shielded Display Adapter Cable	P.V.C.

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3 SYSTEM TEST CONFIGURATION

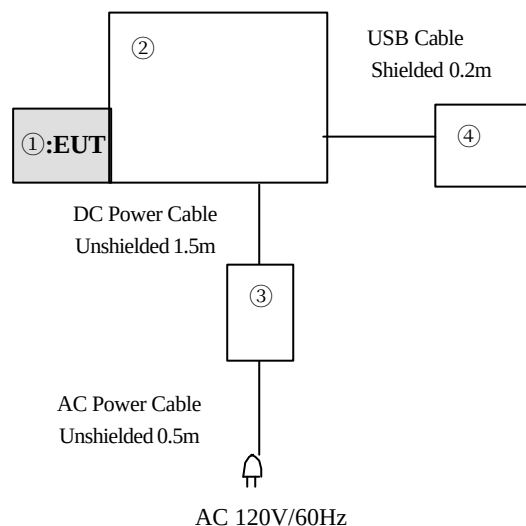
3.1 Justification

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

Operation mode : Data Transmitting Mode(11Mbps)
 Performed the test about channels 1(low), 6(mid) and 11(high) among 11 channels of all Carrier frequencies.
 Receiving mode
 Standby mode(Conducted emission only)

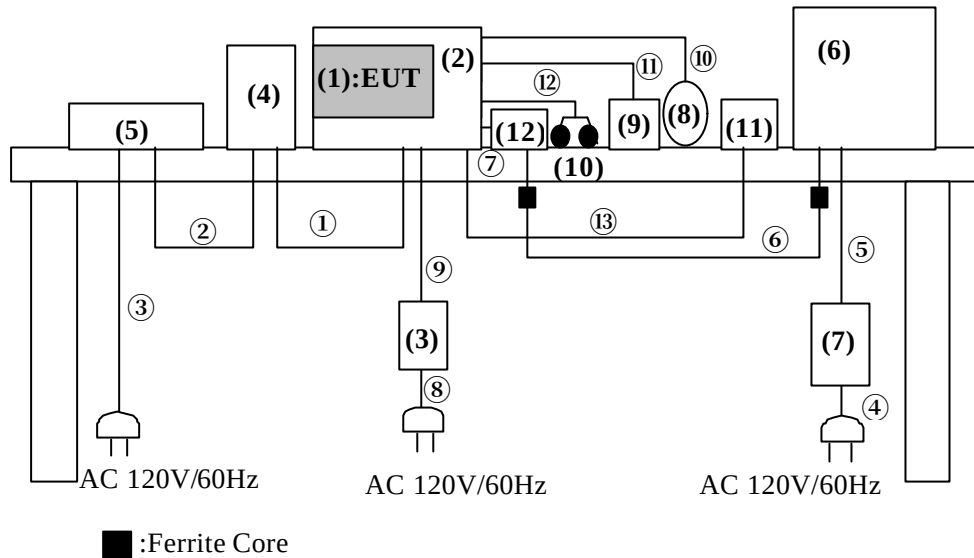
* According to its specification, voltage supplied from host to this equipment is stable and hence this equipment dose not fall into FCC 15.31(e).

3.2.1 Configuration of Tested System (2.1)



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

3.2.2 Configuration of Tested System (2.2)



List of cables used

No.	Name	Length (m)	Shield	Remark
①	DV Cable VMC-IL4408A	0.8	Y	-
②	DC Cable	2.0	N	-
③	AC Cable	1.5	N	-
④	AC Cable	1.5	N	-
⑤	DC Cable	1.0	N	-
⑥	VGA Cable	1.2	Y	-
⑦	Display Adapter Cable	0.1	Y	-
⑧	AC Cable	0.5	N	-
⑨	DC Cable	1.5	N	-
⑩	USB Mouse Cable	0.8(8) / 1.8(8)''	Y	-
⑪	Microphone Cable	1.5	Y	-
⑫	Stereo Headphone Cable	1.2	Y	-
⑬	Telephone Switcher Cable	0.4	N	-

Test report

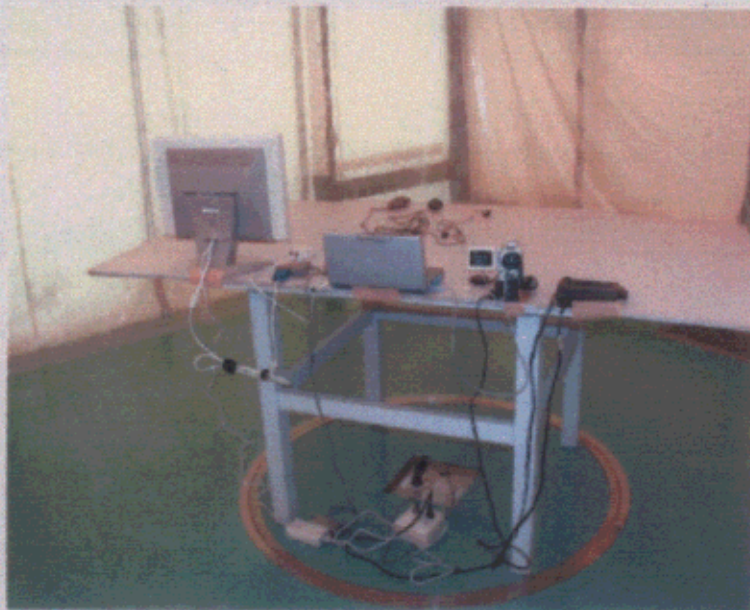
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3.3 Radiated Measurement Photos(30MHz – 1000MHz)



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Test report

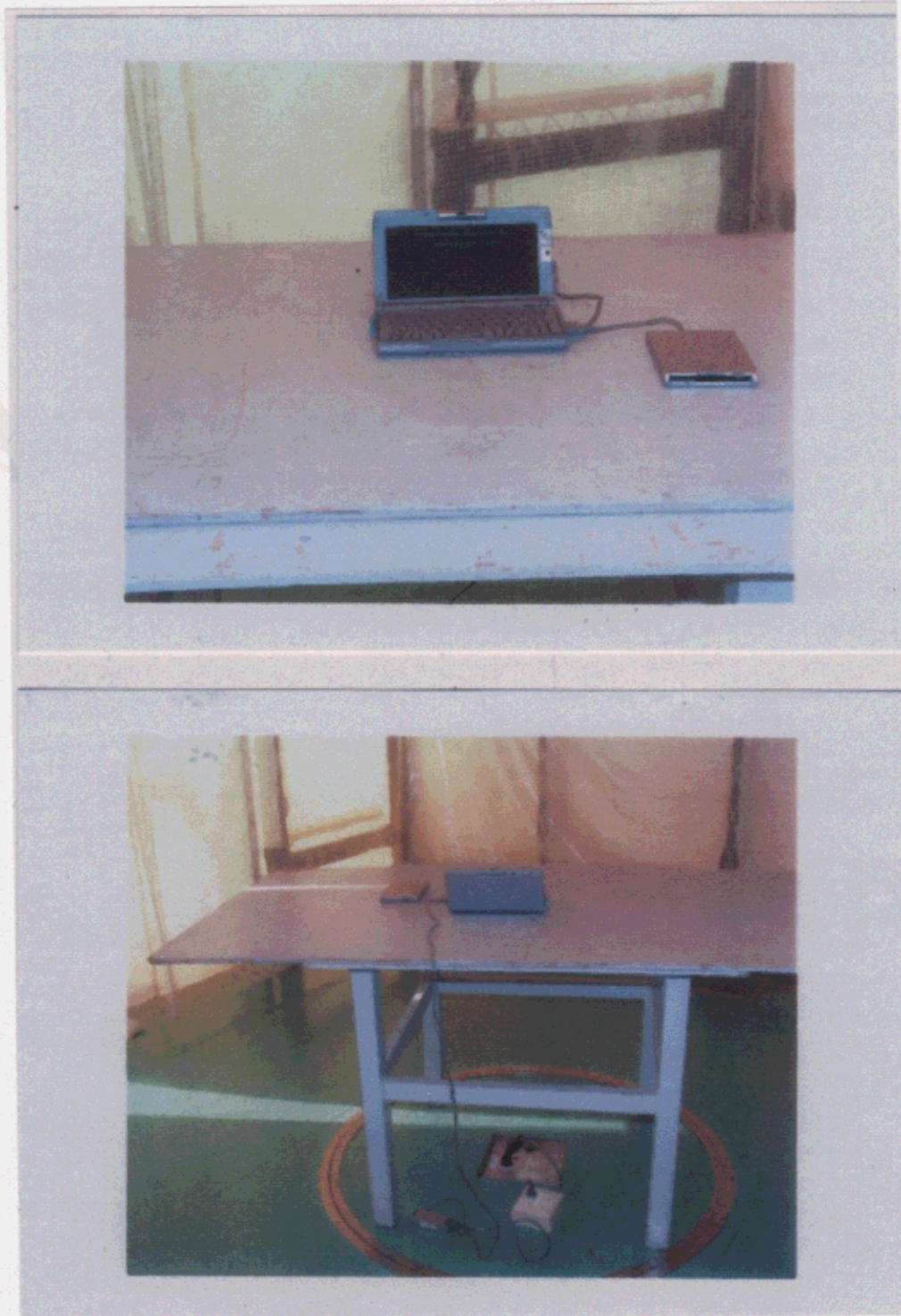
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3.4 Radiated Measurement Photos(1GHz – 26GHz)



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3.5 Conducted Power and Bandwidth Measurement Photos



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3.6 Conducted Measurement Photos



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4 Measurement Uncertainty

Conducted Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 2.0\text{dB}$.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin (more than 2.0dB).

☒ 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 was $\pm 3.3\text{dB}$.

☐ The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

☒ The data listed in this test report has enough margin, more than 3.3dB.

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5 SUMMARY OF TESTS

Direct sequence spread spectrum radio system operating in the 2400-2483.5MHz bands.

5.1 Section 15.247(a)(2) Bandwidth

6dB band width > 500kHz

① 2412MHz(Low) : Appendix A1(Conducted)

② 2437MHz(Mid) : Appendix A2(Conducted)

③ 2462MHz(High) : Appendix A3(Conducted)

Summary of the test result : Pass

5.2 15.247(b) Maximum Peak Out Put Power(Radiated and Conducted)

Maximum peak output power limit 1W

Radiated:

① 2412MHz(Low) : Appendix A4,5,6

② 2437MHz(Mid) : Appendix A4,7,8

③ 2462MHz(High) : Appendix A4,9,10

Conducted:

① 2412MHz(Low) : Appendix A11,12

② 2437MHz(Mid) : Appendix A11,13

③ 2462MHz(High) : Appendix A11,14

Summary of the test result : Pass

* Antenna Gain dose not exceed 6dBi.

5.3 15.247(c) Out of Band Emissions and Restricted Band Radiation

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 26GHz)

30MHz to 1GHz (15.209)

① 2437MHz (Mid) : Appendix A15,16

1GHz to 26GHz (15.209)

② Low / Mid / Hight : Appendix A17, 18

③ Out of band : Appendix A19 to 22

Summary of the test result : Pass

5.4 15.247(d) Power Density(Conducted)

Power density limit 8dBm

① 2412MHz(Low) : Appendix A23,24

② 2437MHz(Mid) : Appendix A23,25

③ 2462MHz(High) : Appendix A23,26

Summary of the test result : Pass

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5.5 15.207 Conducted Emissions

① 2437MHz(Mid)and Standby : Appendix A27 to 35

Summary of test result : Pass

5.6 15.247(e) Processing Gain

See reference Lucent Technologies Report No."011734,Rev.B"

Summary of test result : Pass

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Name	Manufacturer	Model	Control No.	Calibrated Until
Pre Amplifier	Hewlett Packard	8447D	AF-01	November 16, 2000
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 16, 2000
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	April 29, 2001
Logperiodic Antenna	Schwarzbeck	UHALP9108-A	LA-06	April 29, 2001
LISN	Rohde & Schwarz	ESH3-Z5	LS-04	November 15, 2000
LISN	Schwarzbeck	NSLK8126	LS-07	November 15, 2000
Horn Antenna	AH System, Inc	SAS-200/571	HA-01	February 4 , 2001
Horn Antenna	EMCO	3160-09	APANT14	February 4 , 2001
Spectrum Analyzer	Hewlett packard	8560A	SA-02	November 21, 2000
Spectrum Analyzer	Hewlett packard	8567A	SA-03	May 13, 2001
Spectrum Analyzer	Hewlett packard	8567A	SA-04	December 13, 2000
Spectrum Analyzer	Advantest	R3271	SA-05	September 27, 2000
Test Receiver	Rohde & Schwarz	ESHS-20	TR-01	March 30, 2001
Test Receiver	Rohde & Schwarz	ESVS-30	TR-02	July 13, 2001
Test Receiver	Rohde & Schwarz	ESHS-30	TR-03	July 13, 2001
Signal Generator	Wiltron	68247B	APSSG03	August 09, 2001

All measurement equipment is traceable to national standards.

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APPENDIX

Test Data

① 6dB Bandwidth (5.1)	<u>A 1 - A 3</u>
② Maximum peak output power (5.2)	<u>A 4 - A14</u>
③ Out of band emissions and restricted band radiation (5.3)	<u>A15 – A22</u>
④ Power density (5.4)	<u>A23 – A26</u>
⑤ Conducted Emission(5.5)	<u>A27 - A35</u>

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