

EMI TEST REPORT

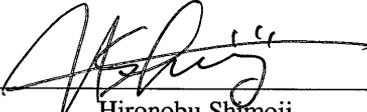
Test Report No. : 23CE0075-HO-2

Applicant : Sony Corporation
Type of Equipment : Digital Video Camera Recorder
Model No. : DCR-TRV80
Test standard : FCCPart15 Subpart C
Section15.207, Section 15.247
FCC ID : AK8DCRTRV80
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : November 15, 19 and 20, 2002

Tested by : 
Hiroka Umeyama
EMC Head Office Division

Approved by : 
Hironobu Shimoji
Group Leader of EMC Head Office Division

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SECTION 1: Client information

Company name : Sony Corporation
Address : 6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo 141- 0001 Japan
Telephone Number : +81-3-5769-5643
Facsimile Number : +81-3-5769-5963
Contact Person : Susumu Ishiwata

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Digital Video Camera Recorder
Model No. : DCR-TRV80
Serial No. : 111, 175 module Ver.A
108, 172 module Ver.B
Rating : DC 7.2V
AC Adaptor AC 120V/60Hz
Country of Manufacture : Japan
Receipt Date of Sample : November 14, 2002
Condition of EUT : Engineering prototype

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2.2 Product Description

Model: DCR-TRV80 which was referred to as the EUT in this report is a Digital Video Camera Recorder. The specification is as following;

Equipment Type	:	Transceiver
Clock frequency used in EUT	:	67.5MHz
Frequency characteristics	:	from 2400MHz to 2483.5MHz
Number of Channel/ Channel spacing	:	79 channels/ 1MHz
Modulation	:	FSK (Frequency Shift Keying) and FHSS (Frequency Hopping Spread Spectrum)
Antenna Type	:	External grounded planner inverted-F type antenna
Antenna Gain	:	0 dBi
ITU code	:	F1D

***FCC Part 15.31 (e)**

The host device DCR-TRV80 provide the stable power supply (DC: 7.2V), and the Digital Video Camera Recorder complies power supply regulation.

***FCC Part 15.203 Antenna requirement**

Digital Video Camera Recorder and its antenna comply with this requirement since they are built in host device DCR-TRV80 when they are put up for sale and they are used with a particular antenna connector.

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SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted Emissions
Section 15.247 Operation within the Band 902-928MHz, 2400-2483.5MHz, and
5725-5850MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	ANSI C63.4:2001	Section 15.207	N/A	N/A	18.48dB 4.8831MHz, N	Complied
2	Carrier Frequency Separation	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	N/A	Complied
3	20dB Bandwidth	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	N/A	Complied
4	Number of Hopping Frequency	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	N/A	Complied
5	Dwell time	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	N/A	Complied
6	Maximum Peak Output Power	ANSI C63.4:2001	Section15.247(b)(1)	Conducted	N/A	N/A	Complied
7	Band Edge Compliance	ANSI C63.4:2001	Section15.247(c)	Conducted	N/A	N/A	Complied
8	Spurious Emission	ANSI C63.4:2001	Section15.247(c)	Conducted / Radiated	N/A	3.1dB 270.00MHz Horizontal	Complied

These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems .

3.3 Additions to Standards

No addition, deviation or exclusion has been made from standards.

3.4 Confirmation

A-Pex International hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C Section 15.207 and 15.247.

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3.5 Uncertainty

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test was ± 1.3 dB.

The data listed in this test report has enough margin, more than the site margin.

Spurious Emission(Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ± 6.6 dB.

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

Other test except Conducted Emission and Spurious Emission(Radiated)

The measurement uncertainty (with a 95% confidence level) for this test was ± 3.0 dB.

The data listed in this test report has enough margin.

3.6 Test Location

A-Pex International Co., Ltd. EMC Head Office Division. No.1semi Anechoic chamber.

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This semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002.

(Registration number: No. 1: 846015 Industry Canada: No.1: IC4247-2)

*NVLAP Lab. code: 200572-0

3.7 Test set up, Data of EMI and Test instruments

Refer to APPENDIX 1 to 3.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

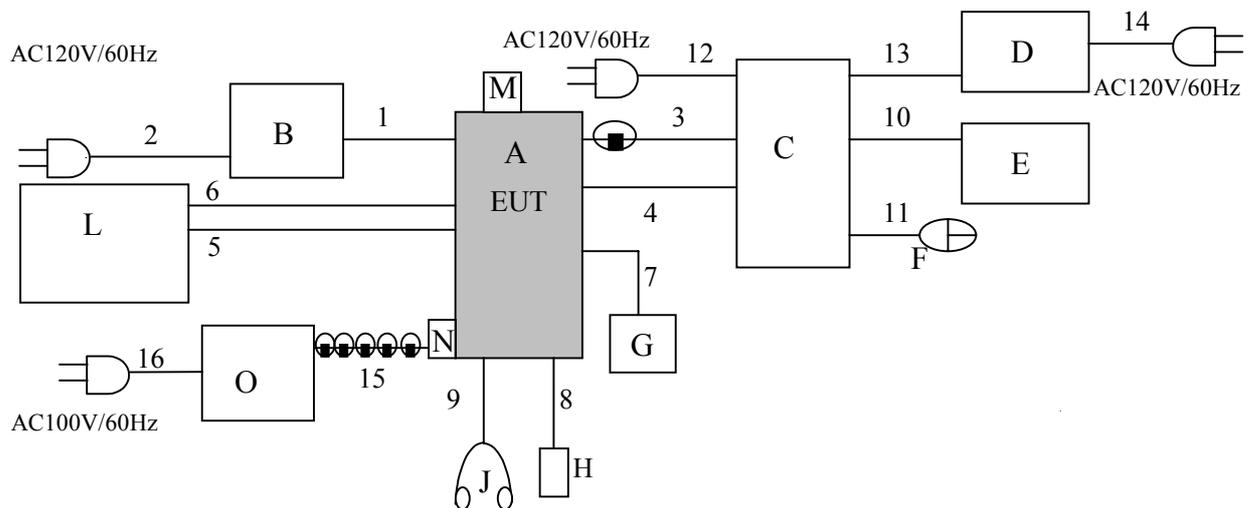
The sequence is used :

1. Transmitting mode (2402MHz)
2. Transmitting mode (2441MHz)
3. Transmitting mode (2480MHz)
4. Transmitting (Hopping on)
5. Inquiry

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

4.2 Configuration and peripherals

[Conducted Emission and Spurious Emission(Radiated)]



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

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Digital Video Camera Recorder	DCR-TRV80	108, 111	SONY	AK8DCRTRV80	EUT
B	AC Adaptor	AC-L15A	30000159	SONY	-	-
C	PC	PCV-J21MBP	0003016	SONY	-	-
D	CRT	PCVD-A201	169-0034466	SONY	-	-
E	Keyboard	PCVA-KB1P/JA	0140216	SONY	-	-
F	Mouse	177220771	S01-Y300273Y	SONY	-	-
G	Remote Commander	RM-95	-	SONY	-	-
H	Microphone	ECM-S959C	-	SONY	-	-
J	Headphones	MDR-Z900	-	SONY	-	-
L	Digital Video Cassette Recorder	GV-D1000	320084	SONY	-	-
M	Video Flash Light	HVL-FDH4	-	SONY	-	-
N	JIG	-	-	SONY	-	-
O	DC Power Supply	6642A	MY40000358	Agilent	-	-

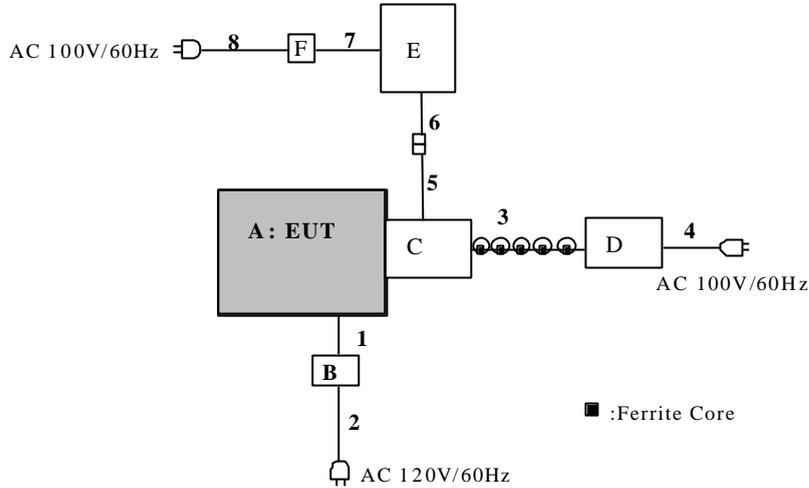
List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	DC Power Cable	1.7	N	Polyvinyl chloride
2	AC Power Cable	1.9	Y	Polyvinyl chloride
3	USB Cable	1.4	Y	Polyvinyl chloride
4	i-Link Cable	2.1	Y	Polyvinyl chloride
5	Video/Audio Cable	1.3	Y	Polyvinyl chloride
6	S-Video Cable	1.4	Y	Polyvinyl chloride
7	Remote Control Cable	1.4	N	Polyvinyl chloride
8	Microphone Cable	0.5	Y	Polyvinyl chloride
9	Headphone Cable	1.3	Y	Polyvinyl chloride
10	Keyboard Cable	1.8	Y	Polyvinyl chloride
11	Mouse Cable	1.8	Y	Polyvinyl chloride
12	AC Power Cable	1.7	N	Polyvinyl chloride
13	RGB Cable	1.4	Y	Polyvinyl chloride
14	AC Power Cable	2.2	N	Polyvinyl chloride
15	DC Power Cable	1.0	N	Polyvinyl chloride
16	AC Power Cable	2.0	N	Polyvinyl chloride

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[Other tests except Conducted Emission and Spurious Emission(Radiated)]



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

Description of EUT and Support equipment

No	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Digital Video Camera Recorder	DCR-TRV80	172, 175	SONY	AK8DCRTRV80	EUT
B	AC ADAPTOR	AC-L15A	30000159	SONY	-	-
C	JIG	-	-	SONY	-	-
D	DC Power Supply	6642A	MY40000358	Agilent	-	-
E	Note PC	PCG-622N	283315101601515	SONY	-	-
F	AC Adaptor	PCGA-AC19V2	0202B1170157A	SONY	-	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	DC Power Cable	1.7	N	Polyvinyl chloride
2	AC Power Cable	1.9	N	Polyvinyl chloride
3	DC Power Cable	1.0	N	Polyvinyl chloride
4	AC Power Cable	2.0	N	Polyvinyl chloride
5	RS232C Cable	1.8	Y	Polyvinyl chloride
6	RS232C Cable	0.5	Y	Polyvinyl chloride
7	DC Power Cable	2.0	N	Polyvinyl chloride
8	AC Power Cable	0.7	N	Polyvinyl chloride

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SECTION 5: Conducted Emission, Section 15.207

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 flushed with rear of tabletop. All other surfaces of tabletop were 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, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a reference ground plane 4.0 x 4.0m in a No.2 semi Anechoic Chamber.

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 9 kHz).

Measurement range: 0.15-30MHz

Test data : **APPENDIX 2**
Test result : **Pass**
Test instruments : **MTR-02, MSA-02, MCC-13, MLS-05, MLS-06, MTA-01, MPL-01**

SECTION 6: Carrier Frequency Separation , Section 15.247(a)(1)

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : **APPENDIX 2**
Test result : **Pass**
Test instruments : **MTR-01, MCC-05**

SECTION 7: 20dB Bandwidth , Section 15.247(a)(1)

Test Procedure

The 20dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : **APPENDIX 2**
Test result : **Pass**
Test instruments : **MTR-01, MCC-05**

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SECTION 8: Number of Hopping Frequency, Section 15.247(a)(1)(iii)

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 9: Dwell time, Section 15.247(a)(1)(iii)

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 10: Maximum Peak Output Power, Section 15.247(b)(1)

Test Procedure

The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 11: Band Edge Compliance, Section 15.247(c)

Test Procedure

The Band Edge Compliance was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

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SECTION 12: Spurious Emission , Section 15.247(c)

[Conducted]

Test Procedure

The Spurious Emission (Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : **APPENDIX 2**
Test result : **Pass**
Test instruments : **MTR-01, MCC-05**

[Radiated]

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The Radiated Electric Field Strength intensity has been measured in No.2 semi anechoic chamber (7.5x5.8x5.2m) 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 2**
Test result : **Pass**
Test instruments : **MTR-01, MCC-12, MCC-05, MCC-06, MHA-05, MPA-01**
MBA-03, MLA-03, MPA-04, MAT-07, MCC-11
MBF-01, MHA-01, MSA-02, MTR-02

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APPENDIX 1: Photographs of test setup

- Page 14 : Conducted Emission
Page 15 : Spurious Emission(Radiated)
Page 16 : Other test except Conducted Emission and Spurious Emission(Radiated)

APPENDIX 2: Data of EMI test

- Page 17-28 : Conducted Emission (module Ver.A/B)
Page 29-34 : Carrier Frequency Separation (module Ver.A/B)
Page 35-40 : 20dB Bandwidth (module Ver.A/B)
Page 41-48 : Number of Hopping Frequency (module Ver.A/B)
Page 49-58 : Dwell time (module Ver.A/B)
Page 59-64 : Maximum Peak Output Power (module Ver.A/B)
Page 65-70 : Band Edge Compliance (module Ver.A/B)
Page 71-142 : Spurious Emission (module Ver.A/B)

APPENDIX 3: Test instruments

- Page 143 : Test instruments

APPENDIX 1: Photographs of test setup

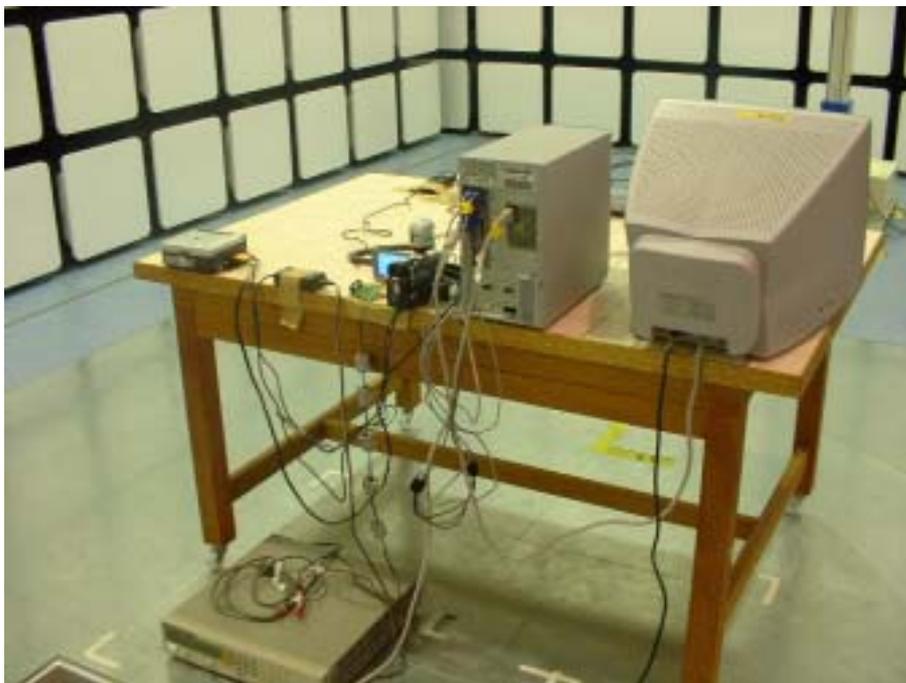
Conducted Emission



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Spurious Emission(Radiated)



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Other test except Conducted Emission and Spurious Emission(Radiated)



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