



## EMI TEST REPORT

Test Report No. : 27LE0344-HO-B-R1

Applicant : Sony Corporation  
Type of Equipment : WLAN MODULE  
Model No. : CMN-727AS  
FCC ID : AK8CMN727AS  
Test regulation : FCC Part 15 Subpart E: 2008  
Section 15.407  
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. Original test report number of this report is 27LE0344-HO-B.

Date of test: February 18 to March 28, 2008

Tested by:

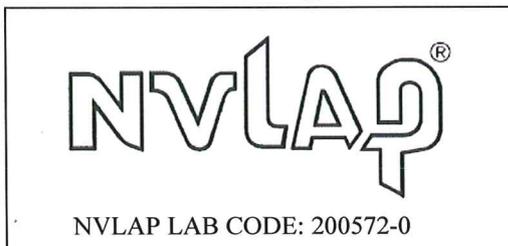
  
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## **SECTION 1: Customer information**

Company Name : Sony Corporation  
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## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : WLAN MODULE  
Model No. : CMN-727AS  
Serial No. : 54: Used for Radiated Spurious Emission and Conducted Spurious Emission tests  
55: Used for Antenna Terminal test  
Rating : DC3.3V  
Country of Mass-production : Japan  
Receipt Date of Sample : February 5, 2008  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No modification by the test lab.

### **2.2 Product Description**

Model No: CMN-727AS (referred to as the EUT in this report) is the WLAN MODULE which is installed in the DATA PROJECTOR (Host device) manufactured by Sony Corporation.

Clock frequency(ies) in the system : WLAN chip: 40MHz  
Other Clock Frequency : 33MHz (PCI)

Equipment Type	Transceiver	
Frequency of Operation	11b/11g	2412MHz - 2462MHz
	11a	5180MHz, 5200MHz, 5220MHz, 5240MHz
Type of Modulation	11b	DSSS
	11a/11g	OFDM
Bandwidth & Channel Spacing	11b/11g	18MHz & 5MHz
	11a	18MHz & 20MHz
Power Supply	DC3.3V	
Antenna Type	Chip Antenna	
Antenna Connector Type	U.FL	
Antenna Gain	2.0dBi	

\*Two types of Power Supply Unit are chosen as the circuit of power supply for representative host device.

-Power Supply Unit 1 (Model Number: PS200)

-Power Supply Unit 2 (Model Number: PS100)

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### **SECTION 3: Test specification, procedures & results**

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart E: 2008, final revised on May 19, 2008  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart E Unlicensed National Information Infrastructure Devices  
Section 15.407 General technical requirements

\*The revision on May 19, 2008 does not influence the test specification applied to the EUT.

#### **FCC 15.31 (e)**

This EUT is provided stable voltage(DC3.3V) constantly from the host device. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203/212 Antenna requirement**

The EUT has an external antenna connector, but it is installed in the specific host device of EUT by the professionals. Therefore, the equipment complies with the antenna requirement of Section 15.203/212.

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### 3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	26dB Emission Bandwidth	FCC :FCC Public Notice DA 02-2138A1 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands "	FCC: 15.407(a)(1)	Conducted	N/A	See data	N/A
		IC: -	IC: RSS-210 A.9.2 (1)				
2	Maximum Peak Output Power	FCC :FCC Public Notice DA 02-2138A1 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands "	FCC: 15.407(a)(1)	Conducted	N/A		Complied
		IC: -	IC: RSS-210 A.9.2 (1)				
3	Peak Power Spectral Density	FCC :FCC Public Notice DA 02-2138A1 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands "	FCC: 15.407(a)(1)(5)	Conducted	N/A		Complied
		IC: -	IC: RSS-210 A.9.2 (1)				
4	Peak Excursion Ratio	FCC : FCC Public Notice DA 02-2138A1 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands "	FCC: 15.407(a)(6)	Conducted	N/A		Complied
		IC: -	IC: -				
5	Spurious Emission	FCC: ANSI C63.4:2003	FCC: 15.407(b)(1)(5)(6)(7), 15.205 and 15.209	Conducted Radiated	N/A N/A	Complied	
		IC: -	IC: RSS-210 2.6, 2.7 and A.9.3 (1)				
6	Conducted Emission	FCC :ANSI C63.4:2003	FCC: 15.407(b)(6) and 15.207	Conducted	N/A	Complied	
		IC: RSS-Gen 7.2.2	IC: RSS-Gen 7.2.2				
7	Band Edge Compliance	FCC :ANSI C63.4:2003	FCC : 15.407(b)(1)(7), 15.205 and 15.209	Conducted Radiated	N/A	Complied	
		IC: -	IC: RSS-210 2.6, 2.7 and A.9.3 (1)				
8	20dB Emission Bandwidth	FCC :ANSI C63.4:2003	FCC : 15.215(c)	Conducted	N/A	Complied *1)	

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.

\*1) Frequency of operation does not exist in the band of 5250MHz-5350MHz.

\* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

\*These tests were performed without any deviations from test procedure except for additions or exclusions.

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### 3.3 Addition to standards 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	RSS-Gen 4.4.1	Conducted	N/A	N/A	N/A

### 3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission (3m*)	
	150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-40GHz
No.1 semi-anechoic Chamber (±)	3.7dB	3.1dB	4.7dB	4.4dB	3.2dB	3.7dB	3.9dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.3dB	3.9dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB

\*10m/3m = Measurement distance

#### Conducted emission test

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

#### Radiated emission test(3m)

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

#### Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is ±3.0dB.

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### 3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

### 3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

### **4.1 Operating Modes**

The mode was used as shown on the following table:

<b>Test Item</b>	<b>Test mode</b>	<b>Test frequency</b>	<b>Channel</b>
Conducted Emission Spurious Emission	11a, Transmitting (Tx), 54Mbps, (Payload: PN9) ANT A	5180MHz(L) 5200MHz(M) 5240MHz(H)	36 40 48
	11a, Receiving (Rx), ANT A	5200MHz(M)	40
26dB Emission Bandwidth Maximum Peak Output Power Peak Power Spectral Density Peak Excursion Ratio 99% Occupied Bandwidth	11a, Transmitting (Tx), 54Mbps, (Payload: PN9) ANT A	5180MHz(L) 5200MHz(M) 5240MHz(H)	36 40 48
20dB Emission Bandwidth	11a, Transmitting (Tx), 54Mbps, (Payload: PN9) ANT A	5240MHz(H)	48
Transmitting duty was 100% on all tests. (See Page 53)			

\*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum rated power.

All tests were performed on the antenna port A other than the antenna port B, since the antenna port A had the maximum power on conducted peak power.

Although there are three antenna cables (length of 3cm, 25cm, and 50cm), the cable of 3cm was used for the Radiated Spurious emission test, and the cable of 25cm was used for Conducted Spurious emission test. The data of test with other cables were attached as reference data. The difference of cables is only its length.

Since the host device has two types of power supply unit, Conducted Emission test was carried out with Power Supply Unit 1 (Model: PS200) and also Radiated Spurious Emission with Power Supply Unit 2 (Model: PS100), which showed the worse level of spurious emission than another power unit. The difference of power units did not affect the result of Antenna Terminal test.

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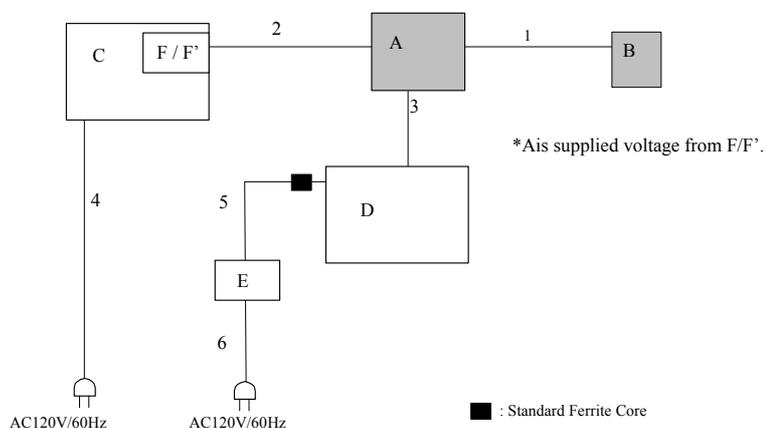
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## 4.2 Configuration and peripherals



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	WLAN MODULE	CMN-727AS	54 *1) 55 *2)	Japan Radio Co., Ltd	EUT
B	ANTENNA BOARD	AH-104N2450D1	26 *3) 5 *4)	SONY	EUT
C	DATA PROJECTOR	VPL-CX125	2000467	SONY	Host device
D	Note PC	PP17L	48643-569-5752	DELL	-
E	AC ADAPTER	AA22850	16293-55G-00JF	DELL	-
F	Power Supply Unit 1	PS200	1	SONY	Part of Host device
F'	Power Supply Unit 2	PS100	1	SONY	Part of Host device

\*1) Used for Spurious emission test.

\*2) Used for antenna terminal conducted test.

\*3) Used with Antenna Cable 0.25 m and 0.50m

\*4) Used with Antenna Cable 0.03m

### List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	Antenna Cable	0.03 0.25 0.50	Shielded	Shielded
2	DC Cable	0.9	Unshielded	Unshielded
3	mini- PCI Extension Cable	0.2	Shielded	Shielded
4	AC Cable	1.9	Unshielded	Unshielded
5	DC Cable	2.0	Unshielded	Unshielded
6	AC Cable	0.9	Unshielded	Unshielded

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## **SECTION 5: Conducted Emission**

### **Test Procedure**

EUT was placed on a wooden table of nominal size, 1.0m by 0.5m, 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. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center .

For the tests on EUT with other peripherals (as a whole system)

I/O cable 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.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.

The EUT was connected to a LISN (AMN).

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**

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## **SECTION 6: Spurious Emission and Band Edge Compliance**

### **[Conducted]**

#### **Test Procedure**

The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

**Test data** : APPENDIX 2

**Test result** : Pass

### **[Radiated]**

#### **Test Procedure**

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, raised 80cm above the conducting ground plane. The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m (Below 10GHz), 1m (10-26.5GHz, Distance Factor :  $20\log(3[m]/1[m])$ ) and 0.5m (Upper 26.5GHz, Distance Factor :  $20\log(3[m]/0.5[m])$ ).

The height of the measuring varied between 1 and 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 with the Test Receiver or the Spectrum Analyzer.

#### Below 1GHz

The result also satisfied with the general limits specified in section 15.209(a).

#### Above 1GHz

Inside of the restricted bands (Section 15.205): Apply to limit in the Section 15.209(a)

Outside of the restricted bands (Section 15.407): Limit -27dBm EIRP

-17dBm EIRP (5.725-5.825GHz Band Edge)

Frequency	Below 1GHz	Above 1GHz (Inside of the restricted bands)	Above 1GHz (Outside of the restricted bands)
Instrument use	Test Receiver	Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz	RBW:1MHz/VBW: 1MHz
IF Bandwidth		AV: RBW:1MHz/VBW:10Hz	

**Test data** : APPENDIX 2

**Test result** : Pass

\*The noise from the EUT was not seen in the above 18GHz. The measurement was made in the residual noise levels.

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## **SECTION 7: 26dB and 20dB Emission Bandwidth**

### **Test Procedure**

The 26dB Emission Bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 8: Maximum Peak Output Power**

### **Test Procedure**

The Peak Transmit Power was measured with a spectrum analyzer connected to the antenna port.  
The test was made with the spectrum analyzer that has a function of channel-power measurement.  
We followed the method 1 specified in DA-02-2138A1.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 9: Peak Power Spectral Density**

### **Test Procedure**

The Peak Power Spectral Density was measured with a spectrum analyzer connected to the antenna port.  
We followed the method 2 specified in DA-02-2138A1.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 10: Peak Excursion Ratio**

### **Test Procedure**

The Peak Excursion Ratio was measured with a spectrum analyzer connected to the antenna port.  
The second Sweep was measured based on Method 1 specified in DA-02-2138A1.

Test data : APPENDIX 2  
Test result : Pass

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