

# RADIO TEST REPORT

**Test Report No. : 27DE0307-HO-D**

**Applicant** : Sony Computer Entertainment Inc.  
**Type of Equipment** : PLAYSTATION®3  
**Model No.** : CECHE01  
**FCC ID** : AK8CBEH1000  
**Test standard** : FCC Part 15 Subpart C  
Section 15.207, Section 15.247: 2006  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.

**Date of test:**

January 9 to 31, 2007

**Tested by:**



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NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://ulapex.jp/emc/nvlap.htm>

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## **SECTION 1: Client information**

Company Name	Sony Computer Entertainment Inc.
Brand Name	SONY
Address	2-6-21 Minamiaoyama, Minato-ku, Tokyo, 107-0062, Japan
Telephone Number	+81-3-6438-8625
Facsimile Number	+81-3-6438-8607
Contact Person	Akiko Tsukada

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

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

Type of Equipment	PLAYSTATION®3
Model No	CECHE01
Serial No	1000041 *1) 1100008 *2)
Rating	AC 120V, 60Hz
Country of Manufacture	JAPAN/CHINA
Receipt Date of Sample	November 28, 2006
Condition of EUT	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	No modification by the test lab.

\*1) Used for all the tests except for Receiving mode at Radiated Spurious Emission test

\*2) Used for Receiving mode at Radiated Spurious Emission test

### **2.2 Product Description**

Model: CECHE01, referred to as the EUT in this report, is a PLAYSTATION®3.

The EUT contains Bluetooth (Ver. 2.0+EDR) module and IEEE802.11b/g WLAN module. Those modules do not transmit simultaneously.

Clock Frequencies are CPU: 3.2GHz(CPU), 66MHz(ATA), 133MHz(ATA), 33MHz(PCI), and 750MHz(SATA1).

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#### Bluetooth (Ver. 2.0+EDR)

Equipment Type	Transceiver	
Frequency of Operation	2402-2480MHz	
Type of Modulation	FHSS (GFSK, $\pi/4$ -DQPSK, 8DPSK)	
Bandwidth & Channel spacing	1MHz & 1MHz	
Power Supply (inner)	DC3.3V	
Antenna Type	ANT1: Reverse F Antenna *1) (manufacturer: SMK / AMP)	ANT2: Dipole Antenna
Antenna Gain	ANT1: 0.21dBi (max)	ANT2: 4.13 dBi (max)
Antenna Connector Type	ANT1: N/A	ANT2: N/A

#### IEEE802.11b/g WLAN

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	
Type of Modulation	DSSS/OFDM	
Bandwidth & Channel spacing	20MHz & 5MHz	
Power Supply (inner)	DC 3.3V/DC1.3V	
Antenna Type	ANT0: Reverse F Antenna	ANT1: Reverse F Antenna
Antenna Gain	ANT0: 0.10dBi max	ANT1: 0.91dBi max
Antenna Connector Type	ANT0: U.FL	ANT1: N/A

\*This report is for Class II permissive change and refers only to Bluetooth module test result, as the modification was made only to Bluetooth module part. Thus, the test result of WLAN part is not included in the report.

- \*1) Model: CECHE01 has the following difference from the original model: CECEHA01  
- Reverse F Antenna (for Bluetooth module), Model: 1-754-469-11 modified version is added newly.  
In this test report, it is described as "SMK (Mod)"

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

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C : 2006

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits : 2006  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz : 2006

### 3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results	Mode *0)
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC: Section 15.207	-	N/A	4.0dB 1.88132MHz AV, L	Complied	1, 2, 4
		IC: RSS-Gen 7.2.2	IC: RSS-Gen 7.2.2					
2	Carrier Frequency Separation	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)	Conducted	N/A	See data.	Complied	1, 2, 5
		IC: -	IC: RSS-210 A8.1 (2)					
3	20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)	Conducted	N/A		Complied	1, 2, 5
		IC: -	IC: RSS-210 A8.1 (1)					
4	Number of Hopping Frequency	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)(iii)	Conducted	N/A		Complied	1, 2, 5
		IC: -	IC: RSS-210 A8.1 (4)					
5	Dwell time	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)(iii)	Conducted	N/A		Complied	1, 2, 5
		IC: -	IC: RSS-210 A8.1 (4)					
6	Maximum Peak Output Power	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(b)(1)	Conducted	N/A		Complied	1, 2, 3, 5
		IC: RSS-Gen 4.6	IC: RSS-210 A8.4 (2)					
7	Band Edge Compliance	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(d)	Conducted	N/A		Complied	1, 2
		IC: -	IC: RSS-210 A8.5					
8	Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(d)	Conducted/ Radiated	N/A	[Tx] 4.4dB 324.003MHz QP, Horizontal [Rx] 3.4dB 4500.1MHz AV, Vertical	Complied	1, 2, 4
		IC: RSS-Gen 4.7 RSS-Gen 4.8	IC: RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3					

Note: UL Apex's EMI Work Procedures No.QPM05 and QPM15.

\*0) Please refer to Section 4.1 for details of test mode.

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

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

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### 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results	Mode *0)
1	99% Occupied Band Width	RSS-Gen 4.4.1	RSS-Gen 4.4.1	Conducted	N/A	N/A	N/A	1, 2

\*0) Please refer to Section 4.1 for details of test mode.

### 3.4 Uncertainty

#### Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 2.66\text{dB}$ .  
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  $\pm 4.59\text{dB}(3\text{m})$ .  
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 4.62\text{dB}(3\text{m})$ .  
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 5.27\text{dB}$ .  
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 3.0\text{dB}$ .

### 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	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
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	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	2.0 x 2.0 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 5.4 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	-

\* 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.7 shielded room.

### 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 used for test : [Bluetooth : FHSS]

1. Transmitting mode: GFSK (Packet size DH1<sup>\*1</sup>, DH3<sup>\*1</sup>, DH5, Data packet: PRBS9)

- Low Channel : 2402MHz
- Mid Channel : 2441MHz
- High Channel : 2480MHz
- Hopping ON

2. Transmitting mode: 8DPSK<sup>\*2</sup> (Packet size 3-DH1<sup>\*1</sup>, 3-DH3<sup>\*1</sup>, 3-DH5, Data packet: PRBS9)

- Low Channel : 2402MHz
- Mid Channel : 2441MHz
- High Channel : 2480MHz
- Hopping ON

3. Transmitting mode:  $\pi/4$ -DQPSK (Packet size: 2-DH5, Data packet: PRBS9)

- Low Channel : 2402MHz
- Mid Channel : 2441MHz
- High Channel : 2480MHz

4. Receiving mode

- Mid Channel : 2441MHz

5. Inquiry mode (only for Antenna Terminal Conducted test)

<sup>\*1</sup>) Used for Dwell time test only

<sup>\*2</sup>) As the Conducted Power level at 8DPSK was higher than the one at  $\pi/4$  - DQPSK, the test was performed at 8DPSK.

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

\*Antenna Terminal Conducted test was performed with Antenna 2, as it has the highest power level compared to Antenna 1 at preliminary test.

**Remarks:** Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

However, the limit level 125mWof AFH mode was used due to the overlap of the bandwidth.

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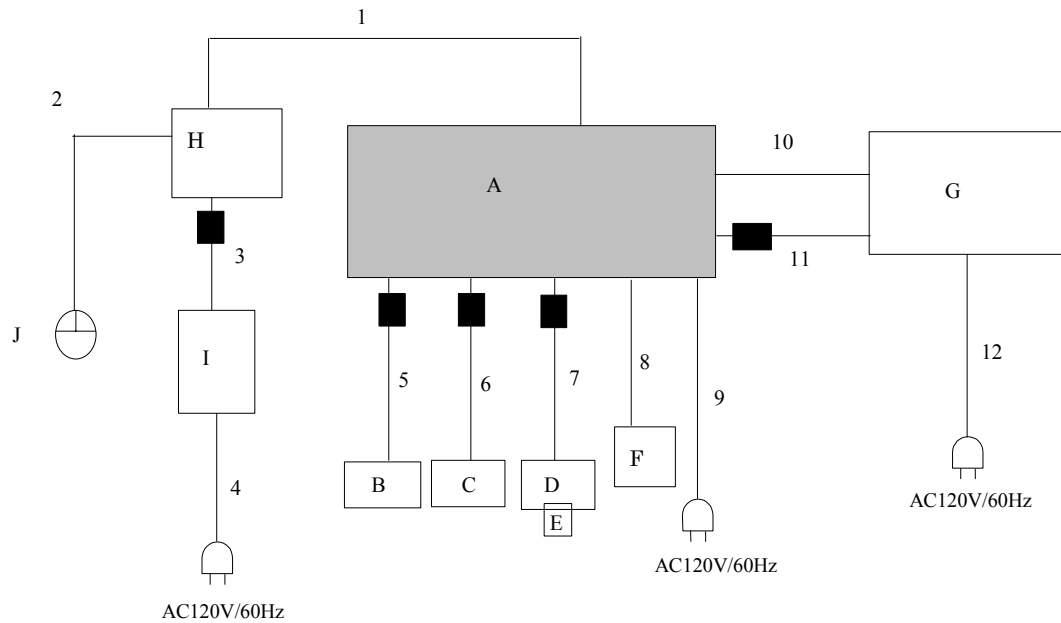
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## 4.2 Configuration and peripherals



\* Cabling and setup 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	PLAYSTATION®3	CECHE01	1000041 *1) 1100008 *2)	Sony Computer Entertainment Inc.	EUT
B	PLAYSTATION®3 Controller	CECHZC1J	016110403277	Sony Computer Entertainment Inc.	-
C	PLAYSTATION®3 Controller	CECHZC1J	016110403269	Sony Computer Entertainment Inc.	-
D	USB Memory Adapter	-	40	Sony Computer Entertainment Inc.	-
E	USB Memory Card	SCPH-1020	-	Sony Computer Entertainment Inc.	-
F	PSP	PSP1000	27400000-0782619	Sony Computer Entertainment Inc.	-
G	Display	MDT201WS	5Z001932GJ	MITSUBISHI	-
H	Note PC	ThinkPad X40	KV-DNK71	IBM	-
I	AC Adaptor	02K6808	11S02K6808 Z1Z 89H52GA21	IBM	-
J	Mouse	M-UB48	LZE02601001	Logitech	-

\*1) Used for all the tests except for Receiving mode at Radiated Spurious Emission test

\*2) Used for Receiving mode at Radiated Spurious Emission test

#### List of cables used

No.	Name	Length (m)	Cable Shielding	Connector Shielding	Remark
1	LAN Cable	2.9	Unshielded	Unshielded	-
2	USB Cable	0.8	Shielded	Shielded	-
3	DC Cable	2.0	Unshielded	Unshielded	One ferrite core (standard attachment)
4	AC Cable	1.0	Unshielded	Unshielded	-
5	USB Cable	1.5	Shielded	Shielded	One ferrite core (standard attachment)
6	USB Cable	1.5	Shielded	Shielded	One ferrite core (standard attachment)
7	USB Cable	1.5	Shielded	Shielded	One ferrite core (standard attachment)
8	USB Cable	0.5	Shielded	Shielded	-
9	AC Cable	2.5	Unshielded	Unshielded	-
10	HDMI Cable	2.0	Shielded	Shielded	-
11	AV Multi Cable	2.5	Unshielded	Unshielded	One ferrite core (standard attachment)
12	AC Cable	2.0	Unshielded	Unshielded	-

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a urethane 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. 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. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

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.

<b>Detector</b>	<b>: CISPR quasi-peak and average detector (IF BW 9 kHz)</b>
<b>Measurement range</b>	<b>: 0.15-30MHz</b>
<b>Test data</b>	<b>: APPENDIX 2</b>
<b>Test result</b>	<b>: Pass</b>

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## **SECTION 6: Spurious Emission**

### **[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, 1m by 1.5m, 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) and 1m(Upper 10GHz).

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 (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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.

**20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7(IC) and outside the restricted band of FCC 15.205 / Table 1 of RSS-210 2.7 (IC)**

**(\*frequencies at which the margin is below the site uncertainty described in Section 3.4)**

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW:1MHz/VBW: 1MHz
IF Bandwidth	20dBc : RBW: 100kHz VBW: 300kHz (S/A)	AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

- The carrier level and noise levels were confirmed at each position of X and Y axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

- ANT 1 has the following three models: made by AMP, SMK, and SMK(modified version)

ANT 1 (Reverse F Antenna)	Test Item
AMP	Full test
SMK	Full test at Ch: Mid, Band edge at Ch: Low/High
SMK (Mod)	Full test at Ch: Mid, Band edge at Ch: Low/High

#### **Dwell time factor**

(FCC Public Notice DA 00-705 : Released March 30, 2000

Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems )

As the carrier frequency may occupy each channel twice for a period of 100ms when AFH functions and the number of Hopping channel is reduced to minimum 20, the following equation was used.

- Duty cycle correction factor =  $20\log [Dwell\ time(ms)^2 / 100(ms)]$

**Test data** : APPENDIX 2

**Test result** : Pass

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## **SECTION 7: Bandwidth**

### **Test Procedure**

The 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 Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.

It was measured based on "Power Output Option 1" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ".

Test data	: APPENDIX 2
Test result	: Pass

## **SECTION 9: Carrier Frequency Separation**

### **Test Procedure**

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

Test data	: APPENDIX 2
Test result	: Pass

## **SECTION 10: Number of Hopping Frequency**

### **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

## **SECTION 11: Dwell time**

### **Test Procedure**

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

Test data	: APPENDIX 2
Test result	: Pass

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