



## SAR TEST REPORT

Test Report No. : 27JE0092-HO-D-R1

Applicant : Sony Computer Entertainment Inc.  
Type of Equipment : PSP  
Model No. : PSP-2001  
FCC ID : AK8PSP2001  
Test standard : FCC47CFR 2.1093  
FCC OET BULLETIN 65, SUPPLEMENT C  
Test Result : Complied  
Max. SAR Value : 0.141W/kg (Body, 2437MHz)

1. This test report shall not be reproduced except full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above standard. We hereby certify that the data contain a true representation of the SAR profile.
4. The test results in this test report are traceable to the national or international standards.
5. Original test report number for this report is 27JE0092-HO-D.

Date of test:

May 25, 2007

Tested by:

Hisayoshi Sato  
EMC Services

Approved by :

Hironobu Shimoji  
Assistant Manager of EMC Services



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://uljapan.co.jp/emc/nvlap.htm>

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MF060b (26.04.07)

<b>CONTENTS</b>	<b>PAGE</b>
<b>SECTION 1: Client information</b> .....	<b>3</b>
<b>SECTION 2: Equipment under test (E.U.T.)</b> .....	<b>3</b>
2.1 Identification of E.U.T.....	3
2.2 Product Description .....	4
<b>SECTION 3 : Test standard information</b> .....	<b>5</b>
3.1 Requirements for compliance testing defined by the FCC.....	5
3.2 Exposure limit .....	6
<b>SECTION 4 : Test result</b> .....	<b>7</b>
4.1 Result of Max. SAR value.....	7
4.2 Test Location .....	7
<b>SECTION 5 : Operation of E.U.T. during testing</b> .....	<b>8</b>
5.1 Confirmation before SAR testing.....	8
5.2 Confirmation after SAR testing .....	8
5.3 Operating modes for SAR testing .....	8
5.4 Test setup of EUT .....	10
<b>SECTION 6 : Test surrounding</b> .....	<b>11</b>
6.1 Measurement uncertainty .....	11
<b>SECTION 7 : Confirmation before/after testing</b> .....	<b>12</b>
7.1 Conducted power before .....	12
<b>SECTION 8 : Measurement results</b> .....	<b>13</b>
8.1 Body SAR 2450MHz .....	13
<b>APPENDIX 1 : Photographs of test setup</b> .....	<b>14</b>
<b>APPENDIX 2 : SAR Measurement data</b> .....	<b>29</b>
1. Evaluation procedure .....	30
2. Measurement data (SAR 2450MHz) .....	31
<b>APPENDIX 3 : Test instruments</b> .....	<b>45</b>
1. Equipment used .....	46
2. Dosimetry assessment setup .....	47
3. Configuration and peripherals .....	48
4. System components .....	49
5. Test system specifications .....	51
6. Simulated Tissues Composition of 2450MHz .....	53
7. Validation Measurement.....	53
8. System validation data.....	55
9. Validation uncertainty .....	56
10. Validation Measurement data .....	57
11. System Validation Dipole (D2450V2,S/N: 713) .....	58
12. Dosimetric E-Field Probe Calibration (EX3DV4,S/N: 3540).....	67
13. References .....	76

## **SECTION 1: Client information**

Company Name	Sony Computer Entertainment Inc.
Brand name	Sony
Address	2-6-21 Minami-Aoyama, Minato-ku, Tokyo, 107-0062, Japan
Telephone Number	+81-3-6483-8625
Facsimile Number	+81-3-6483-8626
Contact Person	Tatsuya Suzuki

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

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

Type of Equipment	PSP	
Model No.	PSP-2001	
Serial No.	03-TSP1200H-0000114-PSPXXXX	
Country of Manufacture	Japan	
Condition of EUT	Production prototype (Not for sale: This sample is equivalent to mass-produced items.)	
Receipt Date of Sample	May 8, 2007	
Modification of EUT	No modification by the test lab.	
Battery	Type	Li-ion Battery
	Model name	PSP-S110
	Rating	DC3.6V/1400mAh
	Manufacturer	SONY
Option Battery 1	Type	Li-ion Battery
	Model name	PSP-110
	Rating	DC3.6V/1800mAh
	Manufacturer	SONY
Option Battery 2	Type	Li-ion Battery
	Model name	PSP-110
	Rating	DC3.6V/1800mAh
	Manufacturer	Matsushita
Option Battery 3	Type	Li-ion Battery
	Model name	PSP-280
	Rating	DC3.6V/2200mAh
	Manufacturer	SONY
Category Identified	Portable device	
Accessories	Earphone, USB cable	

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## 2.2 Product Description

### Radio Specification

#### Wireless LAN Module (IEEE802.11b)

Equipment Type	Transceiver
Frequency of Operation	2412-2462 MHz
Clock Frequency	40MHz
ITU Code	G1D
Type of Modulation	DSSS
Method of frequency generation	Crystal
Antenna model	HFS36-SO01
Antenna type	Inverted F antenna
Antenna Gain	+3.5 dBi (Max.)
Max. Output Power (Peak)	12.31dBm (17.02mW)

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### **SECTION 3 : Test standard information**

#### **3.1 Requirements for compliance testing defined by the FCC**

The US Federal Communications Commission has released the report and order "Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

1 Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).

2 IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

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### 3.2 Exposure limit

#### (A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

#### (B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

**Occupational/Controlled Environments:** are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

**General Population/Uncontrolled Environments:** are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

**NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE  
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT  
1.6 W/kg**

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## **SECTION 4 : Test result**

### **4.1 Result of Max. SAR value**

**Max. SAR Value (IEEE 802.11b) : 0.141 W/kg (Body, 2437MHz)**

### **4.2 Test Location**

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## **SECTION 5 : Operation of E.U.T. during testing**

### **5.1 Confirmation before SAR testing**

#### **Correlation between EMC power and SAR power (Peak Power test)**

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)  
The result is shown in Section 7.1.1

### **5.2 Confirmation after SAR testing**

It is checked that the power drift value at each measurement is within  $\pm 5\%$  as to the power change before and after the SAR test.

### **5.3 Operating modes for SAR testing**

#### **5.3.1 Setting of EUT**

1. IEEE 802.11b mode  
Tx frequency band : 2412-2462MHz  
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)  
Modulation : DSSS (DBPSK,DQPSK,CCK)  
Crest factor : 1

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### 5.3.2 SAR Measurement (Radiated power is always monitored by Spectrum Analyzer.)

#### **IEEE 802.11b**

The 11b (DSSS) mode test was performed on the CCK[11Mbps] modulation, because it was the highest peak power and data rate.

Step1. Search for the worst position of the battery

Step2. Change to the option battery 1

This test was performed at the worst conditions of Step 1.

Step3. Change to the option battery 2

This test was performed at the worst conditions of Step 1.

Step4. Change to the option battery 3

This test was performed at the worst conditions of Step 1.

Step5. Change to the Low and High channels

This test was performed at the worst conditions of Step 1 to 4.

#### **Change distance between EUT and SAM Twin Phantom**

Step6. Change separation

The measurement was performed with the distance, 5mm,10mm and 15mm to check if the shortest distance may not have the worst value at the conditions of the highest SAR value.

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#### 5.4 Test setup of EUT

When users operate or carry the EUT, it could be considered to touch or get close to their bodies. In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

(1) Front:

The test was performed in touch with Front surface of the EUT to the flat section of SAM Twin phantom.

(2) Rear :

The test was performed in touch with Rear surface of the EUT to the flat section of SAM Twin phantom.

(3) Left Side :

The test was performed in touch with Left Side surface of the EUT to the flat section of SAM Twin phantom.

(4) Bottom :

The test was performed in touch with Bottom surface of the EUT to the flat section of SAM Twin phantom.

(5) Top :

The test was performed in touch with Top surface of the EUT to the flat section of SAM Twin phantom.

(6) Front (with the option battery) :

The test was performed in touch with Front surface of the EUT with the option battery to the flat section of SAM Twin phantom.

(7) Front (5mm) :

The measurement opened 5mm distance between the EUT and flat section of SAM Twin Phantom.

(8) Front (10mm) :

The measurement opened 10mm distance between the EUT and flat section of SAM Twin Phantom.

(9) Front (15mm) :

The measurement opened 15mm distance between the EUT and flat section of SAM Twin Phantom.

\*The test setup photograph is put on appendix 1.

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## **SECTION 6 : Test surrounding**

### **6.1 Measurement uncertainty**

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[6][7] and is given in the following Table.

Error Description	Uncertainty value $\pm$ %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
<b>Measurement System</b>						
Probe calibration	$\pm 6.8$	Normal	1	1	$\pm 6.8$	$\infty$
Axial isotropy of the probe	$\pm 4.7$	Rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$\pm 1.9$	$\infty$
Spherical isotropy of the probe	$\pm 9.6$	Rectangular	$\sqrt{3}$	$(cp)^{1/2}$	$\pm 3.9$	$\infty$
Boundary effects	$\pm 2.0$	Rectangular	$\sqrt{3}$	1	$\pm 1.2$	$\infty$
Probe linearity	$\pm 4.7$	Rectangular	$\sqrt{3}$	1	$\pm 2.7$	$\infty$
Detection limit	$\pm 1.0$	Rectangular	$\sqrt{3}$	1	$\pm 0.6$	$\infty$
Readout electronics	$\pm 0.3$	Normal	1	1	$\pm 0.3$	$\infty$
Response time	$\pm 0.8$	Rectangular	$\sqrt{3}$	1	$\pm 0.5$	$\infty$
Integration time	$\pm 2.6$	Rectangular	$\sqrt{3}$	1	$\pm 1.5$	$\infty$
RF ambient Noise	$\pm 3.0$	Rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
RF ambient Reflections	$\pm 3.0$	Rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
Probe Positioner	$\pm 0.8$	Rectangular	$\sqrt{3}$	1	$\pm 0.5$	$\infty$
Probe positioning	$\pm 9.9$	Rectangular	$\sqrt{3}$	1	$\pm 5.7$	$\infty$
Max.SAR Eval.	$\pm 4.0$	Rectangular	$\sqrt{3}$	1	$\pm 2.3$	$\infty$
<b>Test Sample Related</b>						
Device positioning	$\pm 2.9$	Normal	1	1	$\pm 2.9$	11
Device holder uncertainty	$\pm 3.6$	Normal	1	1	$\pm 3.6$	7
Power drift	$\pm 5.0$	Rectangular	$\sqrt{3}$	1	$\pm 5.8$	$\infty$
<b>Phantom and Setup</b>						
Phantom uncertainty	$\pm 4.0$	Rectangular	$\sqrt{3}$	1	$\pm 2.3$	$\infty$
Liquid conductivity (target)	$\pm 5.0$	Rectangular	$\sqrt{3}$	0.64	$\pm 1.8$	$\infty$
Liquid conductivity (meas.)	$\pm 5.0$	Rectangular	1	0.64	$\pm 3.2$	$\infty$
Liquid permittivity (target)	$\pm 5.0$	Rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Liquid permittivity (meas.)	$\pm 5.0$	Rectangular	1	0.6	$\pm 3.0$	$\infty$
<b>Combined Standard Uncertainty</b>					<b><math>\pm 13.48</math></b>	
<b>Expanded Uncertainty (k=2)</b>					<b><math>\pm 26.96</math></b>	

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## **SECTION 7 : Confirmation before/after testing**

### **7.1 Conducted power before**

#### **7.1.1 Correlation of EMC power and SAR power**

This data is reference data of EMC test. (Report No. 27JE0092-HO-A)

Date of test: May 30, 2007

##### **IEEE802.11b , 11Mbps**

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	1.05	1.10	10.00	12.15	16.41
Mid	2437.0	0.27	1.10	10.00	11.37	13.71
High	2462.0	0.76	1.10	10.00	11.86	15.35

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

This data is confirmation before SAR test.

Date of test: May 25, 2007

##### **IEEE802.11b , 11Mbps**

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	1.21	1.10	10.00	12.31	17.02
Mid	2437.0	0.47	1.10	10.00	11.57	14.35
High	2462.0	0.94	1.10	10.00	12.04	16.00

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

#### **7.1.2 Reference data of SAR test (Data rate determination)**

Date of test: May 25, 2007

##### **[IEEE802.11b] Rate check (Peak power)**

Modulation	Data rate	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
						[dBm]	[mW]
DBPSK	1	2437.0	0.28	1.10	10.00	11.38	13.74
DQPSK	2	2437.0	0.33	1.10	10.00	11.43	13.90
CCK	5.5	2437.0	-0.10	1.10	10.00	11.00	12.59
	11	2437.0	0.47	1.10	10.00	11.57	14.35

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

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**SECTION 8 : Measurement results**

**8.1 Body SAR 2450MHz**

Liquid Depth (cm) : 15.1 Model : PSP-2001  
Parameters :  $\epsilon_r = 50.8, \sigma = 2.01$  Serial No. : 03-TSP1200H-0000114-  
PSPXXXX  
Ambient temperature(deg.c.) : 25.0 Modulation : DSSS  
Relative Humidity (%) : 45 Crest factor : 1  
Date : May 25, 2007 Measured By : Hisayoshi Sato

BODY SAR MEASUREMENT RESULTS									
Frequency			Modulation	Phantom Section	EUT Set-up Conditions		Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Band	Channel	[MHz]			Position	Separation [mm]	Before	After	value of multi-peak
<b>11b Step 1 Search for the worst position</b>									
Mid	2437	CCK(11Mbps)	Flat	Front	0	24.3	24.3	0.141	
Mid	2437	CCK(11Mbps)	Flat	Rear	0	24.4	24.4	0.074	
Mid	2437	CCK(11Mbps)	Flat	Left side	0	24.3	24.3	0.069	
Mid	2437	CCK(11Mbps)	Flat	Bottom	0	24.3	24.3	0.042	
Mid	2437	CCK(11Mbps)	Flat	Top	0	24.3	24.3	0.054	
<b>Step 2 Change to the option battery 1</b>									
Mid	2437	CCK(11Mbps)	Flat	Front	0	24.3	24.3	0.114	
<b>Step 3 Change to the option battery 2</b>									
Mid	2437	CCK(11Mbps)	Flat	Front	0	24.3	24.3	0.108	
<b>Step 4 Change to the option battery 3</b>									
Mid	2437	CCK(11Mbps)	Flat	Front	0	24.2	24.2	0.115	
<b>Step 5 Change to the Low and High channels</b>									
Low	2412	CCK(11Mbps)	Flat	Front	0	24.3	24.3	0.135	
High	2462	CCK(11Mbps)	Flat	Front	0	24.3	24.3	0.123	
<b>Step 6. Change separation</b>									
Mid	2437	CCK(11Mbps)	Flat	Front	5	24.3	24.3	0.091	
Mid	2437	CCK(11Mbps)	Flat	Front	10	24.2	24.1	0.031	
Mid	2437	CCK(11Mbps)	Flat	Front	15	24.1	24.1	0.014	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body SAR: 1.6 W/kg		
Spatial Peak Uncontrolled Exposure / General Population							(averaged over 1 gram)		