

Test report No. Page

: 29GE0205-HO-01-B-R1

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RADIO TEST REPORT

Test Report No.: 29GE0205-HO-01-B-R1

Sand Dollar Enterprise, Inc. **Applicant**

Type of Equipment Computer Entertainment System

Model No. **CECH-2001A**

FCC ID XCET12NA28K

Test regulation FCC Part 15 Subpart C 2009

Section 15.207, Section 15.247

Test Result Complied

This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.

- The results in this report apply only to the sample tested.
- 3. This sample tested is in compliance with the 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.
- Original test report number of this report is 29GE0205-HO-01-B.

Date of test:

March 9 to April 1, 2009

Tested by:

Takumi Shimada **EMC Services**

Takavuki Shimada **EMC Services**

Kazufumi Nakai **EMC Services**

Approved by:

Mitsuru Fujimura 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.html

UL Japan, Inc. **Head Office EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124 MF060b (09.01.08)

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Radiated Spurious Emission (Below 1GHz)	
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<u>.</u>	
99% Occupied Bandwidth	

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SECTION 1: Customer information

Company Name	Sand Dollar Enterprise, Inc.
Address	919 East Hillsdale Boulevard, Foster City, CA 94404
Telephone Number	1-650-655-8040
Contact Person	Riley Russell

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

2.1 Identification of E.U.T.

Type of Equipment	Computer Entertainment System
Model No	CECH-2001A
Serial No	1200162 (Power Supply: SONY)
	1200168 (Power Supply: DELTA)
	1200174: Used for Antenna Terminal Conducted tests
Rating	AC120V / 60Hz
Country of Manufacture	JAPAN/CHINA
Receipt Date of Sample	March 9, 2009
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.

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2.2 Product Description

Model: CECH-2001A, referred to as the EUT in this report, is a Computer Entertainment System.

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

List of Model No.:

Computer Entertainment System/PlayStation®3

Model No.			Drototuna Na		
Model No	Model No.	Destination	Manufacture	Ver.	Prototype No.
	CECH-2001A	UC2	1, 2, 3	Production, 120GB	CBEH-2001

Model No.		Prototypa No		
Model No.	Destination	Manufacture	Ver.	Prototype No.
CECH-2001B	UC2	1, 2, 3	Production, 250GB	CBEH-2001B

Computer Entertainment System/Debugging Station (for PlayStation®3)

	2 cm 2										
Model No.		Drototyna Na									
Destination		Manufacture	Ver.	Prototype No.							
DECH-2000A	SY5	1	Debugging Station, 120GB	DEH-H2500A							
DECH-2000AS	SY5	1	Debugging Station,	DEH-H2500AS							
			(For exhibition),120GB								

Factory:

1. Sony EMCS Corporation Kisarazu Tec

8-4 Shiomi Kisarazu-shi Chiba-ken, 202-0834 Japan

2. Maintek Computer (Suzhou) Co., Ltd.

Bldg. 2, 233 Jin Feng Rd Suzhou Jiangsu China

3. Hongfujin Precision Electrons (Yantai) Co., Ltd.

B Sec Export Processing Zone, 50 Beijing Zhong RD,

Yantai Economic & Technological Development Area, Yantai Shandong China

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The clock frequencies used in the EUT: Max clock frequency is 3.2GHz.

Bluetooth (Ver. 2.0+EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, π/4-DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Power Supply (inner)	DC5.0V
Antenna Type	PIFA
Antenna Gain	2.5 dBi (max)
Antenna Connector Type	U.FL

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)	DC5.0V	
Antenna Type	ANT 0: IFA	ANT 1: PIFA
Antenna Gain	ANT 0: 4.3 dBi (max)	ANT 1: 2.5 dBi (max)
Antenna Connector Type	ANT 0: N/A	ANT 1: U.FL

For IEEE802.11b/g WLAN part, please see UL Japan, Inc. Test Report Number: 29GE0205-HO-01-A-R1.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart C: 2009, final revised on February 27, 2009

Title : FCC 47CFR Part15 Radio Frequency Devices Subpart C Intentional

Radiators

Section 15.207 Conducted limits

Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT complies with FCC Part 15 Subpart B. Refer to the test report 29HE0065-YW.

FCC 15.31 (e)

This EUT provides stable voltage(DC5.0V) constantly to RF paet regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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3.2 Procedures and results

[FHSS]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC: Section 15.207	Conducted	N/A	[QP] 6.1dB 0.15285MHz, N	Complied
		IC: RSS-Gen 7.2.2	IC: RSS-Gen 7.2.2			0.15255MHz, N [AV] 1.2dB 3.29982MHz, N	
2	Carrier Frequency	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)	Conducted	N/A	See data.	Complied
	Separation	IC: -	IC: RSS-210 A8.1 (b)				
3	20dB Bandwidth	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)	Conducted	N/A	1	N/A
		IC: -	IC: RSS-210 A8.1 (a)				
4	Number of Hopping	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)(iii)	Conducted	N/A	1	Complied
	Frequency	IC: -	IC: RSS-210 A8.1 (d)				
5	Dwell time	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)(iii)	Conducted	N/A	-	Complied
		IC: -	IC: RSS-210 A8.1 (d)				
6	Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(b)(1)	Conducted	N/A	-	Complied
		IC: RSS-Gen 4.8	IC: RSS-210 A8.4 (2)				
7	Band Edge Compliance	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(d)	Conducted	N/A	-	Complied
		IC: -	IC: RSS-210 A8.5				
8	Spurious Emission	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5	Conducted/ Radiated	N/A	[Tx] 5.9dB 499.985MHz, Vertical, QP	Complied
		RSS-Gen 4.10	RSS-Gen 7.2.1 and 7.2.3			[Rx] 6.4dB 499.989MHz, Vertical, QP	
Note	e: UL Japan, Inc.'s E	MI Work Procedures No.QPM	05 and QPM15.				

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

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3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied	RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A
	Band Width						

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

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

	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission	
Test room		(10111)			(2-11)			(3m*)	
	150kHz-	9kHz-	30MHz-	300MHz-	9kHz-	30MHz-	300MHz-	1GHz-	18GHz-
	30MHz	30MHz	300MHz	1GHz	30MHz	300MHz	1GHz	18GHz	40GHz
No.1 semi-anechoic	3.7dB	3.1dB	4.4dB	4.2dB	3.2dB	3.8dB	3.9dB	5.9dB	6.1dB
chamber (±)									
No.2 semi-anechoic chamber (±)	3.7dB	1	1	1	3.2dB	4.4dB	4.0dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.6dB	4.0dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	3.9dB	3.9dB	5.9dB	6.1dB

^{*10}m/3m = Measurement distance

Conducted emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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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Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124

Telephone : +81 596 24	FCC	IC Registration	Width x Depth x	Size of	Other
	Registration	Number	Height (m)	reference ground plane (m) /	rooms
	Number			horizontal conducting plane	
No.1 semi-anechoic	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power
chamber					source room
No.2 semi-anechoic	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
chamber					
No.3 semi-anechoic	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3
chamber					Preparation
					room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4
chamber					Preparation
					room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
chamber					
No.6 shielded	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
room					
No.6 measurement	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
room			L		
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement	-	-	3.1 x 5.0 x 2.7m	N/A	-
room					
No.9 measurement	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
room					
No.10 measurement	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
room					
No.11 measurement	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-
room					

^{*} 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, 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 Mode(s)**

Test	Mode	Tested frequency
Conducted Emission*1)	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF)	2402MHz(L)
,	- DH5	2441MHz(M)
	- 3DH5	2480MHz(H)
	Bluetooth Receiving (Rx)	2441MHz(M)
Spurious Emission	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF)	2402MHz(L)
(Radiated/Conducted)	- DH5	2441MHz(M) *2)
	- 3DH5	2480MHz(H)
	Bluetooth Receiving (Rx)	2441MHz(M)
Carrier Frequency Separation	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping ON)	2402MHz(L)
	- DH5	2441MHz(M)
	- 3DH5	2480MHz(H)
	Inquiry	2441MHz(M)
20dB Bandwidth	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF)	2402MHz(L)
	- DH5	2441MHz(M)
	- 3DH5	2480MHz(H)
	Inquiry	2441MHz(M)
Number of Hopping	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping ON)	-
Frequency	- DH5	
-45	- 3DH5	
	Inquiry	-
Dwell time	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping ON)	-
	-DH1/DH3/DH5	
	-3DH1/3DH3/3DH5	
	Inquiry	-
Maximum Peak Output Power	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF)	2402MHz(L)
	- DH5	2441MHz(M)
	- 2DH5	2480MHz(H)
	- 3DH5	
	Inquiry	2441MHz(M)
Band Edge Compliance	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping ON/Hopping OFF)	2402MHz(L)
(Conducted)	- DH5	2480MHz(H)
	- 3DH5	
(Radiated)	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF)	2402MHz(L)
	- DH5	2480MHz(H)
	- 3DH5	
99% Occupied Bandwidth	Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping ON/Hopping OFF)	2402MHz(L)
	- DH5	2441MHz(M)
	- 3DH5	2480MHz(H)

As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test). For EDR, test was performed with 3DH5 as a representative.

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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^{*}Since there are two kinds of manufacture's antennas (TYCO and HITACHI), the test was performed with TYCO antenna according to the customer's request because they have identical antenna characteristics.

^{*1)} The test was performed for both of Power Supply: SONY and Power Supply: DELTA. Other tests besides Conducted Emission test were performed with Power Supply: SONY as a representative.

^{*2)} The difference of between Power Supply: SONY and Power Supply: DELTA was confirmed by Bluetooth Transmitting (Tx) Payload: PRBS9 (Hopping OFF) DH5 mode.

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4.2 Configuration and peripherals

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m 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. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

Detector : quasi-peak and average 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

[Conducted]

Test Procedure

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

The following spectrum analyzer setting was used:

- RBW: 100kHz
- VBW: 300kHz
- Sweep: Auto
- Detector: Peak
- Trace: Max Hold

Test data : APPENDIX 2

Test result : Pass

[Radiated]

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m 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.

The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

In any 100kHz bandwidth outside the restricted 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 FCC15.205 / Table 1 of RSS-210 2.7 (IC).

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	AV *1): RBW: 1MHz/VBW: 10Hz or 270Hz *2)
	VBW: 300kHz (S/A)	20dBc: RBW: 100kHz/VBW: 300kHz

^{*1)} When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

- 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.

Test data : APPENDIX 2

Test result : Pass

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^{*2)} VBW was determined that it is calculation based on the frequency of the radio transmitted signal from EUT. Since pulse emission and duty cycle was less than 100%.

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SECTION 7: Bandwidth

20 dB Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port. The following spectrum analyzer setting was used:

- Span: 3MHz - RBW: 30kHz - VBW: 30kHz - Sweep: Auto - Detector: Peak - Trace: Max Hold

Test data : APPENDIX 2

Test result : Pass

99% Occupied Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port. The following spectrum analyzer setting was used:

- Span: Enough width to display 20dB Bandwidth
- RBW: as close to 1% of the Span as is possible without being below 1%
- VBW: Three times of RBW
- Sweep: AutoDetector: PeakTrace: Max Hold

Test data : APPENDIX 2

Test result : Pass

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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.

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. The following spectrum analyzer setting was used:

- Span: 3MHz (Inquiry: 5MHz)

- RBW: 100kHz - VBW: 300kHz - Sweep: Auto - Detector: Peak - Trace: Max Hold

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. The following spectrum analyzer setting was used:

Span: 30MHz
RBW: 300kHz
VBW: 1MHz
Sweep: Auto
Detector: Peak
Trace: Max Hold

Test data : APPENDIX 2

Test result : Pass

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SECTION 11: Dwell time

Test Procedure

The Dwell time was measured with a spectrum analyzer connected to the antenna port. The following spectrum analyzer setting was used:

- Span: Zero Span - RBW: 1MHz - VBW: 3MHz

- Sweep: as necessary to capture the entire dwell time per hopping channel

Detector: function peakTrace: Max Hold

Test data : APPENDIX 2

Test result : Pass

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