



# EMI TEST REPORT

**Test Report No. : 30IE0014-YK-01-A-R1**

**Applicant:** Sony EMCS Corporation Kisarazu TEC  
**Type of Equipment:** Network Audio System / Server  
**Model No.:** NAS-SV20i  
**Test regulation:** FCC Part15 Subpart B: 2010, Class B  
**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 the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This report is a revised version of 30IE0014-YK-01-A. 30IE0014-YK-01-A is replaced with this report.

**Date of test:**

April 21 and July 12, 2010

**Representative test engineer:**

M. Nakatake

Minoru Nakatake  
Engineer of EMC Service

**Approved by:**

T. Imamura

Toyokazu Imamura  
Manager of EMC Service



- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".

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## **SECTION 1: Customer information**

Company Name : SONY EMCS Corporation Kisarazu TEC  
Address : Shinagawa INTERCITY C Tower, 2-15-3 Konan, Minato-ku, Tokyo, 108-6201  
Japan  
Telephone Number : +81-3-5769-5640  
Facsimile Number : +81-3-5769-5915  
Contact Person : Shigeru Higai

Sony EMCS Corporation Kisarazu TEC is on behalf of the applicant: Sony corporation.

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

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

Type of Equipment : Network Audio System/Server  
Model No. : NAS-SV20i  
Serial No. : 81  
Rating : DC19.5V (AC adaptor: AC120V/60Hz)  
Country of Mass-production : China  
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.  
Receipt Date of Sample : April 8, 2010

### **2.2 Product description**

Model: NAS-SV20i (referred to as the EUT in this report) is a Network Audio System/Server.

Clock frequency : Real time clock: 32.768kHz, Audio clock: 11.2896MHz,  
LAN control: 25MHz & 100MHz, Wireless Module: 38.4MHz,  
USB Controller: 26MHz & 60MHz & 480MHz, Main CPU: 500MHz,  
DD converter: 2.25MHz & 400kHz & 700kHz & 300kHz,  
Oscillator circuit: 11.2896MHz, AD converter: 11.2896MHz, Mi-com: 4.194MHz,  
DA converter: 11.2896MHz, Digital Amp: 24.576MHz, Touch SW: 1.6MHz & 20kHz

Equipment type : Transceiver  
Frequency of operation : 2412-2462MHz  
Bandwidth & channel spacing : 20MHz & 5MHz  
Type of modulation : IEEE802.11b: DSSS (DBPSK, DQPSK, CCK)  
IEEE802.11g: OFDM (BPSK, QPSK, 16QAM, 64QAM)  
Antenna type : Chip  
Antenna connector type : None  
Antenna gain : 2.51dBi  
ITU code : D1D, G1D  
Operation temperature range : 0 ~ +40 deg.C.

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

### **3.1 Test specification**

#### **EMI**

Test Specification : FCC Part 15 Subpart B: 2010, final revised on January 22, 2010  
and effective March 1, 2010  
Title : FCC 47CFR Part 15 Radio Frequency Device  
Subpart B Unintentional Radiators

### **3.2 Procedures & results**

<b>Item</b>	<b>Test Procedure</b>	<b>Limits</b>	<b>Worst margin</b>	<b>Result</b>
Conducted emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Class B	18.0dB: Audio Play by Audio In Source mode (0.1500MHz, L1, QP)	Complied
Radiated emission	ANSI C63.4: 2003 8. Radiated emission measurements	Class B	3.5dB: Audio Play by Audio In source mode (98.31MHz, Vertical)	Complied

Note: UL Japan's EMI Work Procedures No. QPM05

### **3.3 Additions to standards**

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

### **3.4 Confirmation**

**UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part15 Subpart B: 2010.**

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### 3.5 Uncertainty

#### EMI

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

	No.1 open site (±)	No.2 open site (±)	No.1 anechoic chamber (±)
<b>Conducted emission</b>			
150kHz-30MHz	3.5 dB	3.5 dB	3.5 dB
<b>Radiated emission (3m)</b>			
30-300MHz	4.4 dB	4.5 dB	4.6 dB
300-1000MHz	4.6 dB	4.7 dB	4.7 dB
1GHz<	3.8 dB	4.2 dB	4.5 dB

#### Conducted Emission Test

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

#### Radiated Emission Test

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

### 3.6 Test Location

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JAB Accreditation No. : RTL02610

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on July 23, 2008 (Registration No.: 95486).

IC Registration No. : 2973B-1

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on October 22, 2008 (Registration No.: 95967).

IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 Semi-anechoic chamber	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7	No.2 Full-anechoic chamber	8.0 x 4.7 x 4.0
No.4 shielded room	5.0 x 4.0 x 2.7		
No.5 shielded room	4.5 x 4.3 x 2.7		

Open test site	Maximum measurement distance
No.1 open test site	30m
No.2 open test site	10m

### 3.7 Test setup, Data of EMI test & 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

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

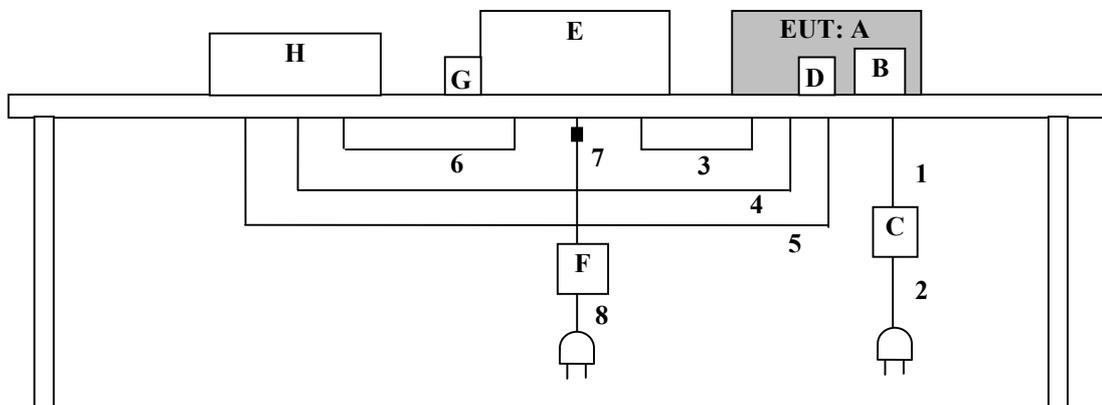
Test sequence is used : 1) Audio Play by Wired LAN mode  
2) Audio Play by iPod mode  
3) Audio Play by Audio In source mode

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

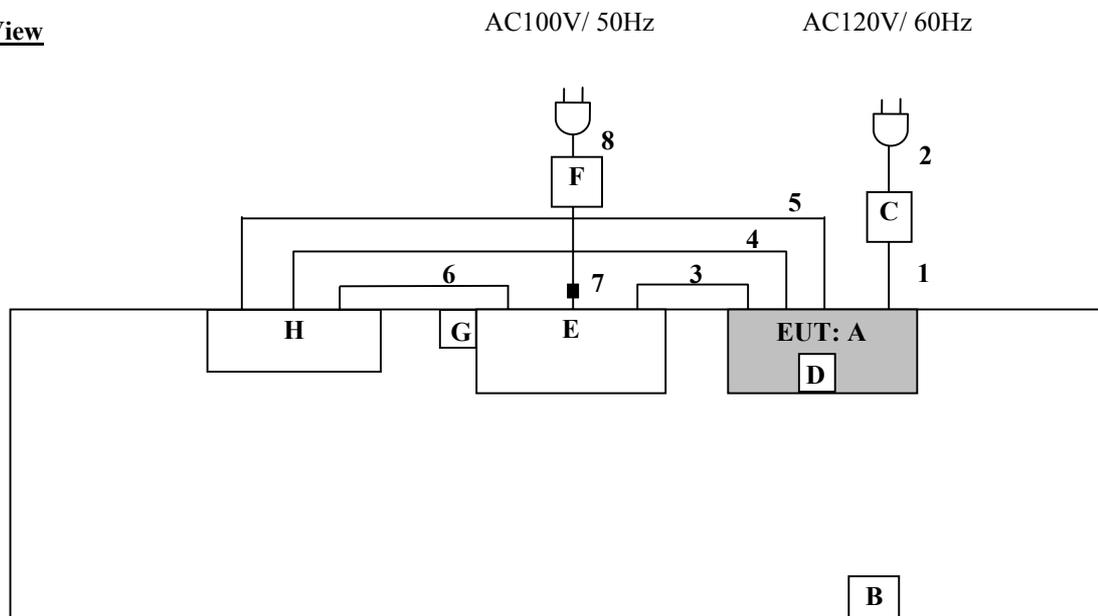
### 4.2 Configuration and peripherals

■: Ferrite core (Standard attachment)

#### Front View



#### Top View



Cabling and setup were taken into consideration and test data was taken under worse case conditions.

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**Description of EUT and support equipment**

No.	Item	Model number	Serial number	Manufacturer *1)	FCC ID	Remarks
A	Network Audio System / Server	NAS-SV20i	81	SONY	AK8NASSV20I	EUT
B	Remote controller	RM-ANU093	-	SONY	-	-
C	AC Adaptor	AC-E1920L	-	SONY	-	-
D	iPod	A1285	YM845G633QX	Apple	-	-
E	Personal Computer	NT757PA	AR09900137	HP	-	*2)
F	AC Adaptor	NSW23579	-	HP	-	-
G	USB MEMORY	MF-AU201G SV/RS	E8052900126	ELECOM	-	-
H	AV Selector	JX-S8	19	Victor	-	-

\*1) "SONY" means Sony Corporation or Sony EMCS Corporation.

\*2) The personal computer has no I/O ports except for USB port.

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC cable	1.8	Unshielded	Unshielded	-
2	AC cable	0.7	Unshielded	Unshielded	-
3	LAN cable	3.0	Unshielded	Unshielded	-
4	Audio cable (IN)	1.5	Unshielded	Unshielded	-
5	Audio cable (OUT)	1.5	Unshielded	Unshielded	-
6	Audio cable	3.0	Shielded	Shielded	-
7	DC cable	1.4	Unshielded	Unshielded	-
8	AC cable	1.7	Unshielded	Unshielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

The test was carried out in No.1 shielded room.

Temperature : See test data  
Humidity : See test data

### **5.2 Test configuration**

EUT was placed on a wooden platform of nominal size, 1m by 1.8m, 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 was aligned and was 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 LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the 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.

Photographs of the set up are shown in Appendix 1.

### **5.3 Test conditions**

Frequency range : 0.15 - 30MHz  
EUT position : Table top  
EUT operation : Audio Play by Wired LAN mode, Audio Play by iPod mode,  
Audio Play by Audio In source mode

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a screened room. The EUT was connected to a LISN. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detector of the test receiver.

Detector Type : Quasi-Peak/ Average  
IF Bandwidth : 9kHz

### **5.5 Results**

Summary of the test results : Pass

Date : July 12, 2010 Test engineer : Takahiro Suzuki

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## **SECTION 6: Radiated emission**

### **6.1 Operating environment**

The test was carried out in No.1 Semi-anechoic chamber.

Temperature : See test data  
Humidity : See test data

### **6.2 Test configuration**

EUT was placed on a platform of nominal size, 0.9m by 1.8m, raised 80cm above the conducting ground plane. The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

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

The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

Photographs of the set up are shown in Appendix 1.

### **6.3 Test conditions**

Frequency range : 30 - 12500MHz  
Test distance : 3m  
EUT position : Table top  
EUT operation : Audio Play by Wired LAN mode, Audio Play by iPod mode,  
Audio Play by Audio In source mode

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on an anechoic chamber with a ground plane and at a distance of 3m. Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was 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.

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

	<u>30-1000 MHz</u>	<u>1000-12500 MHz</u>	
Detector Type :	Quasi-Peak	Peak	*AV
IF Bandwidth :	120kHz	RBW:1MHz / VBW:3MHz	RBW:1MHz / VBW:10Hz

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

### **6.5 Results**

Summary of the test results : Pass

Date : April 21, 2010 Test engineer : Minoru Nakatake

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### **APPENDIX 1: Photographs of test setup**

Page 11: Conducted emission  
Page 12: Radiated emission

### **APPENDIX 2: Data of EMI test**

Page 13 - 21: Conducted emission  
Page 22 - 33: Radiated emission

### **APPENDIX 3: Test instruments**

Page 34: Test instruments

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