



# RADIO TEST REPORT

## Test Report No.: 31DE0280-SH-01-B

**Applicant** : Sony Corporation  
**Type of Equipment** : Wireless Stereo Headphones  
**Model No.** : MDR-RF6500  
**FCC ID** : AK8MDRRF6500  
**Test regulation** : FCC Part15 Subpart C: 2010  
**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.

**Date of test:** January 6 – 8, 2011

**Tested by:** 

Tatsuya Arai  
Engineer of WiSE Japan, UL  
Verification Service

**Approved by :** 

Go Ishiwata  
Assistant Manager of WiSE Japan, UL  
Verification 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 Corporation  
Brand Name : Sony  
Address : Shinagawa INTERCITY C Tower, 2-15-3 Konan, Minato-ku, Tokyo  
108-6201, Japan  
Telephone Number : +81-3-5769-5640  
Facsimile Number : +81-3-5769-5996  
Contact Person : Shigeru Higai

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

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

Type of Equipment : Wireless Stereo Headphones  
Model No. : MDR-RF6500  
Serial No. : Refer to the Section 4.2  
Rating : DC3.7V  
Country of Mass-production : Malaysia  
Receipt Date of Sample : January 6, 2011  
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

### **2.2 Product description**

Model No: MDR-RF6500, referred to as the EUT in this report, is the Wireless Stereo Headphones  
Model No: MDR-DS6500 is the Wireless Stereo Headphone System.  
MDR-DS6500 consists of DP-RF6500 (Digital Surround Processor) and MDR-RF6500 (Wireless Stereo Headphones).

### **General Specification**

Clock frequency(ies) in the system : :DD converter 1.2MHz,Crystal 22.576649MHz,  
Master clock 11.2896MHz

### **Radio Specification**

|                                |                                 |
|--------------------------------|---------------------------------|
| Equipment type                 | : Transceiver                   |
| Frequency of operation         | : 2408MHz-2473MHz               |
| Bandwidth & channel spacing    | : 3MHz & 5MHz                   |
| Type of modulation             | : MSK                           |
| Transmit power                 | : 10mW                          |
| Power control                  | : None                          |
| Method of frequency generation | : Synthesizer                   |
| Operating voltage (RF parts)   | : DC 2.5V                       |
| Antenna type                   | : Pattern Antenna               |
| Antenna Gain                   | : ANT1: -9.7dBi, ANT2: -9.28dBi |
| Antenna connector type         | : Integral                      |
| Operation temperature range    | : 5 ~ +35 deg.C.                |
| Regulator                      | : No                            |

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FCC 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery. Therefore, this EUT complies with the requirement.

FCC Part 15.203

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

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2010, final revised on December 6, 2010 and effective January 5, 2011.  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT complies with FCC Part 15 Subpart B: 2010. Refer to the test report 31DE0280-SH-01-C.

### **3.2 Procedures & Results**

| Item   | Test Procedure   | Specification                   | Remarks              | Deviation | Worst Margin                                  | Results  |
|--|--|---------------------------------|----------------------|-----------|---|----------|
| Conducted Emission   | ANSI C63.4:2003<br>7. AC powerline conducted emission measurements | FCC 15.207                      | -                    | N/A       | N/A   | N/A (*1) |
| 6dB Bandwidth  | ANSI C63.4:2003<br>13. Measurement of intentional radiators        | FCC 15.247 (a)(2) & 15.209      | Conducted            | N/A       | * See data                                    | Complied |
| Maximum Peak Output Power  | ANSI C63.4:2003<br>13. Measurement of intentional radiators        | FCC 15.247 (b)(3) & 15.209      | Conducted            | N/A       |   | Complied |
| Out of Band Emission & Restricted Band Edges   | ANSI C63.4:2003<br>13. Measurement of intentional radiators        | FCC 15.109, 15.247 (d) & 15.209 | Conducted / Radiated | N/A       | 3.2dB (4876.000MHz, AV, Vertical, Tx 2438MHz) | Complied |
| Power Density  | ANSI C63.4:2003<br>13. Measurement of intentional radiators        | FCC 15.247 (e) & 15.209         | Conducted            | N/A       | * See data                                    | Complied |
| <p>Note: UL Japan's EMI Work Procedures No.QPM05 and QPM15.<br/> These tests were also referred to "Guidance on Measurement for Digital Transmission Systems Section15.247".<br/> *1) The EUT operates with a battery and is placed on the Processor to recharge. AC Line can be connected to the EUT via the Processor, however, the EUT stops transmission when it is placed on the Processor. Therefore, the test is not applicable to the EUT.</p> |  |                                 |                      |           |   |          |

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### 3.3 Addition to standard

| Item                     | Test Procedure  | Specification | Remarks     | Worst Margin | Results  |
|--------------------------|---|---------------|-------------|--------------|----------|
| Occupied Bandwidth (99%) | ANSI C63.4:2003<br>13. Measurement of intentional radiators,<br>RSS-Gen 4.6.1 | RSS-Gen 4.6.1 | Conducted - | -            | Complied |

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

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

### 3.4 Uncertainty

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

| Item   | Frequency range | No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±) | No.2 SAC/SR (±) | No.3 SAC/SR (±) |
|--|-----------------|--|-----------------|-----------------|
| <b>Radiated emission</b><br>(Measurement distance: 3m) | 30MHz-300MHz    | 4.7 dB                                       | 4.5 dB          | 4.7 dB          |
|  | 300MHz-1GHz     | 4.5 dB                                       | 4.6 dB          | 4.6 dB          |
|  | 1GHz-13GHz      | 3.9 dB                                       | 3.9 dB          | 4.0 dB          |
| <b>Radiated emission</b><br>(Measurement distance: 1m) | 13GHz-18GHz     | 4.8 dB                                       | 4.8 dB          | 4.8 dB          |
|  | 18GHz-40GHz     | 4.4 dB                                       | 4.2 dB          | 4.2 dB          |

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

#### Radiated emission test

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

#### Antenna Terminal Voltage

Power Measurement uncertainty above 1GHz for this test was: (±) 0.8dB

Conducted emissions, Power Density Measurement (below 1GHz) uncertainty for this test was: (±) 1.1dB

Conducted emissions, Power Density Measurement (1G-3GHz) uncertainty for this test was: (±) 1.2dB

Conducted emissions, Power Density Measurement (3G-18GHz) uncertainty for this test was: (±) 2.9dB

Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 3.4dB

Bandwidth Measurement uncertainty for this test was: (±) 5.4%

Channel power Measurement uncertainty for this test was: (±) 1.4dB

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### 3.5 Test location

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JAB Accreditation No. : RTL02610

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).

IC Registration No. : 2973D-1 (No1 Semi-Anechoic Chamber)

2973D-2 (No2 Semi-Anechoic Chamber)

2973D-3 (No3 Semi-Anechoic Chamber)

| Test room                     | Width x Depth x Height (m)                              | Test room          | Width x Depth x Height (m) |
|-------------------------------|---|--------------------|----------------------------|
| No.1<br>Semi-Anechoic Chamber | 20.6 x 11.3 x 7.65<br>Maximum measurement distance: 10m | No.1 Shielded room | 6.8 x 4.1 x 2.7            |
| No.2<br>Semi-Anechoic Chamber | 20.6 x 11.3 x 7.65<br>Maximum measurement distance: 10m | No.2 Shielded room | 6.8 x 4.1 x 2.7            |
| No.3<br>Semi-Anechoic Chamber | 12.7 x 7.7 x 5.35<br>Maximum measurement distance: 5m   | No.3 Shielded room | 6.3 x 4.7 x 2.7            |
| No.4<br>Semi-Anechoic Chamber | 8.1 x 5.1 x 3.55  | No.4 Shielded room | 4.4 x 4.7 x 2.7            |
|                               |   | No.5 Shielded room | 7.8 x 6.4 x 2.7            |
|                               |   | No.6 Shielded room | 7.8 x 6.4 x 2.7            |

### 3.6 Test setup, Data of EMI & 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**

Test sequence is used : Transmitting (Tx) 2408MHz (with normal modulation, Continuous Transmitting)  
 Transmitting (Tx) 2438MHz (with normal modulation, Continuous Transmitting)  
 Transmitting (Tx) 2473MHz (with normal modulation, Continuous Transmitting)

| Test item  | Operating mode | Tested frequency                |
|--|----------------|---------------------------------|
| Conducted emission<br>Spurious emission  | Tx             | 2408MHz,<br>2438MHz,<br>2473MHz |
| 6dB bandwidth<br>Maximum peak output power<br>Power density<br>99% occupied bandwidth  | Tx             | 2408MHz,<br>2438MHz,<br>2473MHz |
| Restricted band edge   | Tx             | 2408MHz,<br>2473MHz             |
| <p>*Transmitting duty was refer to APPENDIX 2.<br/>           *The worst condition was determined based on the test result of RF output power. Refer to the test data of Maximum peak output power. ANT 2 was selected for the test.<br/>           *As a result of preliminary test, the formal test was performed with the above modes, which had the maximum power.<br/>           *EUT has the test mode settings by the software as follows;<br/>           Test software : DX2516_SRC EMC_26-Oct.rfs<br/>           Version: KLR2010-2.4<br/>           Test commands: SNK_MSK_TX0-14_L2_ANT1.cmd<br/>                             SNK_MSK_TX0-14_L2_ANT2.cmd<br/>           Power settings: -2dBm<br/>           *This setting of software is the worst case.<br/>           Any conditions under the normal use do not exceed the condition of setting.<br/>           In addition, end users cannot change the settings of the output power of the product.</p> |                |                                 |

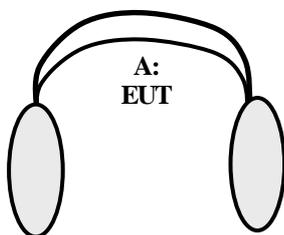
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## 4.2 Configuration of tested system



\* Test data was taken under worse case conditions.

### Description of EUT

| No. | Item                       | Model number | Serial number     | Manufacturer     | Remarks |
|-----|----------------------------|--------------|-------------------|------------------|---------|
| A   | Wireless Stereo Headphones | MDR-RF6500   | 25 (*1)<br>1 (*2) | Sony Corporation | EUT     |

\*1). Used for Spurious emissions test.

\*2). Except for Spurious emissions.

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## **SECTION 5: Radiated emission**

### **5.1 Operating environment**

The test was carried out in No.2 Semi-Anechoic Chamber.

Temperature : See test data (APPENDIX 2)

Humidity : See test data (APPENDIX 2)

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The EUT was put on the center of tabletop.

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.

### **5.3 Test conditions**

Frequency range : 30MHz to 26GHz

Test distance : 3m(below 13GHz) / 1m(above13GHz)

EUT position : Table top

EUT operation mode : Refer to SECTION 4.1

### **5.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m(below 13GHz) / 1m(above 13GHz) (Refer to Figure 1). 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 detection of the test receiver.

|                |   |            |                                     |
|----------------|---|------------|-------------------------------------|
| Frequency      | : | 30-1000MHz | 1000-26000MHz                       |
| Detection Type | : | Quasi-Peak | Peak * Average                      |
| 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.

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

Combinations of the worst position

| Worst position             |                            |
|----------------------------|----------------------------|
| Below 1GHz                 | Above 1GHz                 |
| Horizontal: Y, Vertical: Z | Horizontal: X, Vertical: Y |

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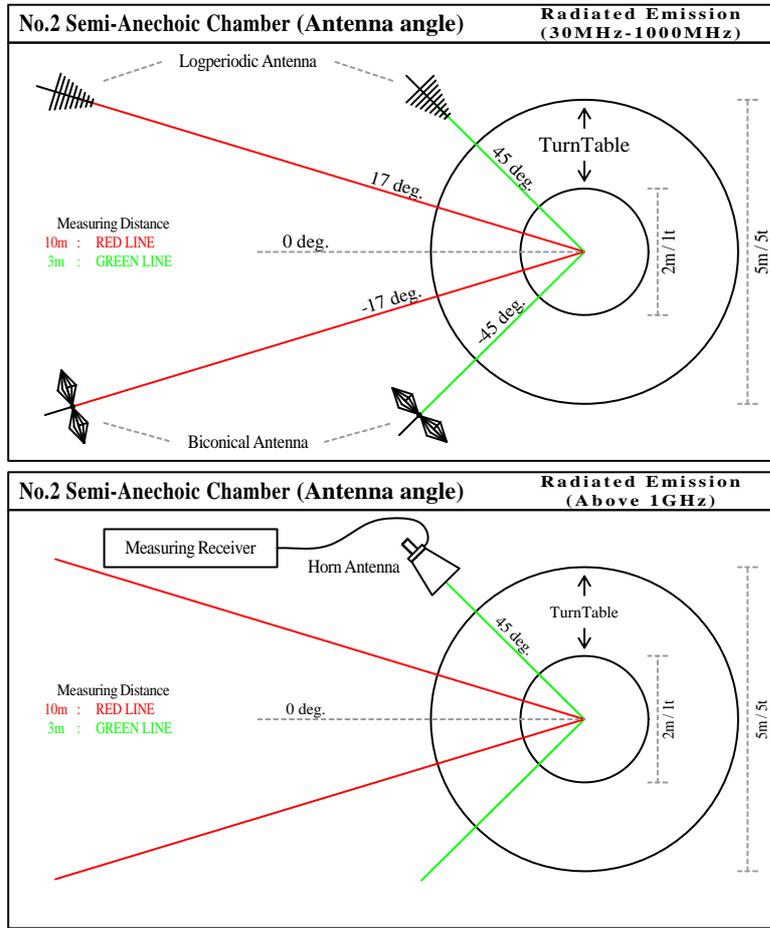
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**Figure 1. Antenna angle**



## 5.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions (Antenna Port Conducted). Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

## 5.6 Results

Summary of the test results : Pass \*No noise was detected above the 5<sup>th</sup> order harmonics.  
Refer to APPENDIX 2

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## **SECTION 6: Out of band emissions (Antenna port conducted)**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 2

## **SECTION 7: 6dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 2

## **SECTION 8: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 2

## **SECTION 9: Peak power density**

### **Test procedure**

The peak power density was measured with a spectrum analyzer connected to the antenna port.

Instrument used : Spectrum Analyzer \*1)

RBW / VBW : 10kHz / 30kHz \*2)

\*1) PSD Option 1 of " Measurement of Digital Transmission Systems Operating under Section 15.247".

\*2) The test was not performed at RBW : 3kHz that was stated in the Regulation.

However, the measurement value with RBW: 3kHz is less than the value of RBW: 10kHz and the test data met the limit with RBW: 10kHz.

Summary of the test results: Pass

Refer to APPENDIX 2

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## **Contents of APPENDIXES**

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

Radiated emission  
Pre-check of worst position

### **APPENDIX 2: Test data**

6dB Bandwidth  
Maximum peak output power  
Radiated emission  
Spurious emission (Antenna port conducted)  
Peak power density  
Occupied Bandwidth

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

Test instruments

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