



# RADIO TEST REPORT

**Test Report No. : 29GE0040-HO-01-A**

**Applicant** : Sony Corporation  
**Type of Equipment** : Remote Commander  
**Model No.** : AIR-RM10  
**FCC ID** : AK8AIRRM10  
**Test regulation** : FCC Part 15 Subpart C 2009  
Section 15.247  
**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 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.

**Date of test:** March 30 to April 3, 2009

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## **SECTION 1: Customer information**

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Contact Person : Kikuo Murata

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

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

Type of Equipment : Remote Commander  
Model No. : AIR-RM10  
Serial No. : 63 (Used for Spurious Emission (Radiated) test only)  
64 (Antenna terminal conducted test only)  
Rating : DC 6.0V  
Receipt Date of Sample : March 26, 2009  
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

### **2.2 Product Description**

Model No: AIR-RM10 (referred to as the EUT in this report) is the Remote Commander.

Clock frequency(ies) in the system : 8MHz (Micom-clock), 1MHz (DD Converter), 40kHz (Infrared Remote Control),  
22MHz (S-AIR module)  
Equipment Type : Transceiver  
Frequency of Operation : 2411.85 to 2463.85MHz  
Bandwidth & Channel Spacing : 22MHz & 26MHz  
Modulation : DSSS  
Power Supply (inner) : DC 3.3V  
Antenna Type : Pattern antenna  
Antenna Connector Type : Integral  
Antenna Gain : 2.1dBi

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

#### **FCC 15.31 (e)**

This EUT provides stable voltage (DC 3.3V) constantly to RF part 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.

### 3.2 Procedures and results

#### [DSSS and other forms of modulation]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	Conducted	N/A *1)	N/A	N/A
2	6dB Bandwidth	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247(a)(2)	Conducted	N/A	See data.	Complied
3	Maximum Peak Output Power	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247(b)(3)	Conducted	N/A		Complied
4	Restricted Band Edges	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247 (d)	Conducted/ Radiated	N/A		Complied
5	Power Density	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section 15.247 (e)	Conducted	N/A		Complied
6	Spurious Emission	"Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	Section15.247(d)	Conducted/ Radiated	N/A		5.5dB (2390.0MHz, Horizontal, PK) (6431.5MHz, Vertical, AV)

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

\*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

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

### 3.3 Addition to standard

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

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.

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

\*10m/3m = Measurement distance

#### Radiated emission test (3m)

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 for this test is 3.0dB.

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### 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	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
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	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 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	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

\* 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.

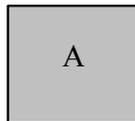
## **SECTION 4: Operation of E.U.T. during testing**

### **4.1 Operating Mode(s)**

<b>Test Item</b>	<b>Operating Mode</b>	<b>Tested frequency</b>
Spurious Emission (Radiated) Maximum Peak Output Power	Transmitting (Tx), Antenna 1* Transmitting (Tx), Antenna 2* 1NACK	2411.85MHz(L) 2437.85MHz(M) 2463.85MHz(H)
Spurious Emission (Conducted) 6dB Bandwidth Power Density 99% Occupied Bandwidth	Transmitting (Tx), Antenna 1* 1NACK	2411.85MHz(L) 2437.85MHz(M) 2463.85MHz(H)
Restricted Band Edge	Transmitting (Tx), Antenna 1* 1NACK	2411.85MHz(L) 2463.85MHz(H)

\* Pseudo random sequence is transmitted continuously.

### **4.2 Configuration and peripherals**



\* Setup was taken into consideration and test data was taken under worse case conditions.

#### **Description of EUT and Support equipment**

<b>No.</b>	<b>Item</b>	<b>Model number</b>	<b>Serial number</b>	<b>Manufacturer</b>	<b>Remarks</b>
A	Remote Commander	AIR-RM10	63 *1) 64 *2)	Sony Corporation	EUT

\*1) Used for Spurious Emission (Radiated) test only

\*2) Used for Antenna terminal conducted test only

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**SECTION 5: Spurious Emission**

**[Conducted]**

**Test Procedure**

The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port. It was measured based on "1. RF antenna conducted test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ". 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**

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, 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 and outside the restricted band of FCC15.205.**

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW: 1MHz/VBW: 1MHz
IF Bandwidth		AV *1): RBW: 1MHz/VBW: 430Hz *2) 20dBc: RBW: 100kHz/VBW: 300kHz

- \*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
- \*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%.

- 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.

**Test data** : APPENDIX 2  
**Test result** : Pass

## **SECTION 6: Bandwidth**

### **6dB Bandwidth**

#### **Test Procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port. It was measured based on "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

The following spectrum analyzer setting was used:

- Span: 50MHz
- RBW: 100kHz
- VBW: 300kHz
- 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: Auto
- Detector: Peak
- Trace: Max Hold

**Test data** : APPENDIX 2  
**Test result** : Pass

## **SECTION 7: 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 8: Peak Power Density**

### **[Conducted]**

#### **Test Procedure**

The Peak Power Density was measured with a spectrum analyzer connected to the antenna port.

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

- Span: 18MHz
- RBW: 30kHz\*)
- VBW: 100kHz
- Sweep: 600sec
- Detector: Peak
- Trace: Clear Write

\*) 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:30kHz and the test data met the limit with RBW:3kHz.

**Test data** : APPENDIX 2  
**Test result** : Pass

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