



# RADIO TEST REPORT

**Test Report No. : 31DE0066-SH-01-A**

**Applicant** : RICOH COMPANY LTD.  
**Type of Equipment** : Copier  
**Model No.** : Aficio SP 5210SR  
**FCC ID** : BBP-RFSHI01  
**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:**

February 22 and 24, 2011

**Representative test  
engineer:**

Shinichi Takano  
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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MF058d (12.01.11)

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**SECTION 1: Customer information**

Company Name : RICOH COMPANY LTD.  
Address : 810 Shimoizumi, Ebina City, Kanagawa-Perf., 243-0460 Japan  
Telephone Number : +81-46-292-9152  
Facsimile Number : +81-46-231-9183  
Contact Person : Akihiro Kurosaka

**SECTION 2: Equipment under test (E.U.T.)****2.1 Identification of E.U.T.**

Type of Equipment : Copier  
Model No. : Aficio SP 5210SR  
Serial No. : S17A2100042  
Rating : AC120-127V/60Hz, 12A  
Country of Mass-production : China  
Receipt Date of Sample : February 22, 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: Aficio SP 5210SR, referred to as the EUT in this report, is the Copier.  
Refer to the Appendix for the difference between the EUT and its similar models.

**General Specification**

Clock frequency(ies) in the system : 13.56MHz

**Radio Specification**

Radio Type : Transceiver  
Frequency of Operation : 13.56MHz  
Clock frequency : 13.56MHz  
Modulation : ASK 100%  
Power Supply (inner) : DC 5.0V  
Antenna type : Print pattern antenna  
ITU code : A1D  
Operating Temperature : +10 deg C - +32 deg C

## FCC 15.31 (e)

Host device (Copier) provides the radio block with stable power supply, and the power is not changed when voltage of the Copier is varied. Therefore, the equipment complies with power supply regulation.

## FCC Part 15.203

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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**SECTION 3: Test specification, procedures and 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 15.215 Additional provisions to the general radiated emission limitations.  
Section 15.225 Operation within the bands 13.110-14.010MHz.

The EUT complies with FCC Part 15 Subpart B: 2010. The test is performed by the customer.

**3.2 Procedures & results**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC Section15.207	-	N/A	7.7dB (13.56000MHz, AV, N)	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.225 (a)	Radiated	N/A	81.5dB (Vertical)	Complied
Electric Field Strength of Outside the Allocated bands	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.225 (b)(c)	Radiated	N/A	44.2dB (14.010MHz, Vertical)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.209 FCC Section15.225 (d)	Radiated	N/A	14.1dB (40.68MHz, Vertical)	Complied
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.215 (c)	Radiated	N/A	-	-
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.225 (e)	Radiated	N/A	-	Complied

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

**3.3 Addition to standard**

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	-	-

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

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### 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 (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.0 dB	2.7 dB	3.1 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.3 dB	2.7 dB	3.4 dB
	30MHz-300MHz	4.7 dB	4.5 dB	4.7 dB
	300MHz-1GHz	4.5 dB	4.6 dB	4.6 dB

\*1: SAC=Semi-Anechoic Chamber

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

Frequency Measurement uncertainty for this test was: (±) 2.1%

#### 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 test report has enough margin, more than site margin.

### 3.5 Test location

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m)/ horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

### 3.6 Test Configuration Photographs, Data of test and Test instruments

Refer to APPENDIX 1 to 3, in this report

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

### 4.1 Operating mode

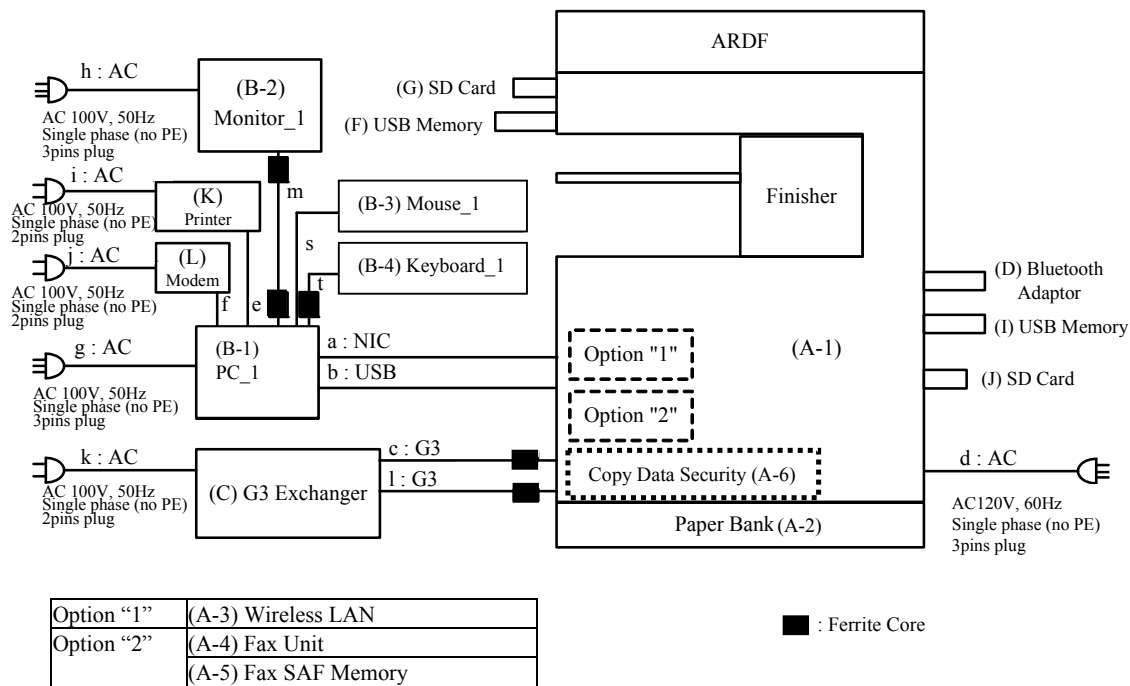
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test item	Operating mode	Tested frequency
All items except for Frequency tolerances	Transmitting (ASK), 26byte Mirror modulation from lower bit -> AM modulation 0x00, 0x00, 0xB3, 0x75, 0xB0, 0x00, 0x00, 0x80, 0x01, 0xff, 0xfe, 0x01, 0x23, 0x45, 0x67, 0x0B, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, CRC, CRC	13.56MHz
Frequency tolerances	Transmitting (Unmodulated)	13.56MHz

Software for testing: M0525771A (V0.31.5)

Above setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting.

### 4.2 Configuration and peripherals



\* 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	Remarks
A-1	Copier	Aficio SP 5210SR	S17A2100042	Ricoh	EUT
A-2	Paper Bank (Not Caster model)	Paper Feed Unit TK1090	HMFA2100016	Ricoh	Engine Option
A-3	Wireless LAN	IEEE 802.11a / g Interface Unit Type J	00500037	Ricoh	Controller Option
A-4	FAX Unit	Fax Option Type SP5200	-	Ricoh	Fax Option
A-5	Fax SAF Memory	Memory Unit Type B 32MB	00300006	Ricoh	Fax Option
A-6	Copy Data Security	Copy Data Security Unit Type F	80700022	Ricoh	-
B-1	HOST PC_1	OPTIPLEX 755	HW33FBX	DELL	-
B-2	Monitor_1	RDT157LM(BK)	7Y200823AJ	MITSUBISHI	-
B-3	Mouse_1	M0C5U0	H0A02POT	DELL	-
B-4	Keyboard_1	L100	CN0RH65765890 83102RM	DELL	-
C	G3 Exchanger	CE-97	0S0025110	neix	-
D	Bluetooth Adaptor	Bluetooth Interface Unit Type D	-	Ricoh	-
F	USB memory	RUF2-M256-S	A51019	Buffalo	-
G	SD Card	QSDS-2G	GA03-6201-0100	PQI	-
I	USB Memory	Trans-it EDGE-LX 4GB	-	TDK	-
J	SD Card	RT-SD064B	BK3CC001056	Panasonic	-
K	Printer	BJ F600	SRE-25	Canon	-
L	Modem	ME331413	6K07040	OMRON	-

**List of cables used**

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
a	100BASE-Tx	3.0	Unshielded	Unshielded	-
b	USB	2.5	Shielded	Shielded	-
c	Modular	2.1	Unshielded	Unshielded	-
d	AC	2.5	Unshielded	Unshielded	-
e	Printer	1.5	Shielded	Shielded	-
f	Serial	1.5	Shielded	Shielded	-
g	AC	1.7	Unshielded	Unshielded	-
h	AC	1.6	Unshielded	Unshielded	-
i	AC	1.5	Unshielded	Unshielded	-
j	AC	1.5	Unshielded	Unshielded	-
k	AC	1.9	Unshielded	Unshielded	-
l	Modular	2.0	Unshielded	Unshielded	-
m	Monitor	1.8	Shielded	Shielded	-
s	Mouse	2.0	Shielded	Shielded	-
t	Keyboard	1.8	Shielded	Shielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

The test was carried out in No.3 shielded room.

Temperature : See test data

Humidity : See test data

### **5.2 Test configuration**

EUT was placed on a platform of 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.

A wooden table of its platform of nominal size 1m by 0.7m was added. 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 50Ω connectors of the LISN were resistively terminated in 50Ω 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

### **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 Line Impedance Stabilization Network (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

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## **SECTION 6: Radiated emissions (Fundamental, Spurious and Outside the Allocated bands)**

### **6.1 Operating environment**

The test was carried out in No.3 anechoic chamber.

### **6.2 Test configuration**

EUT was placed on a platform of 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.

A wooden table of its platform of nominal size 1m by 0.7m was added. 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 : 9kHz - 1GHz

Test distance : 3m

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

Frequency: From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for vertical polarization (antenna angle: 0deg., 45deg., 90deg., and 135 deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 1.

Frequency: From 30MHz to 1GHz at distance 3m

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.

Measurements were performed with QP, PK, and AV detector.

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

	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz	30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	10kHz	9kHz	120kHz
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

\* FCC Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])

490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

### **6.5 Results**

Summary of the test results : Pass

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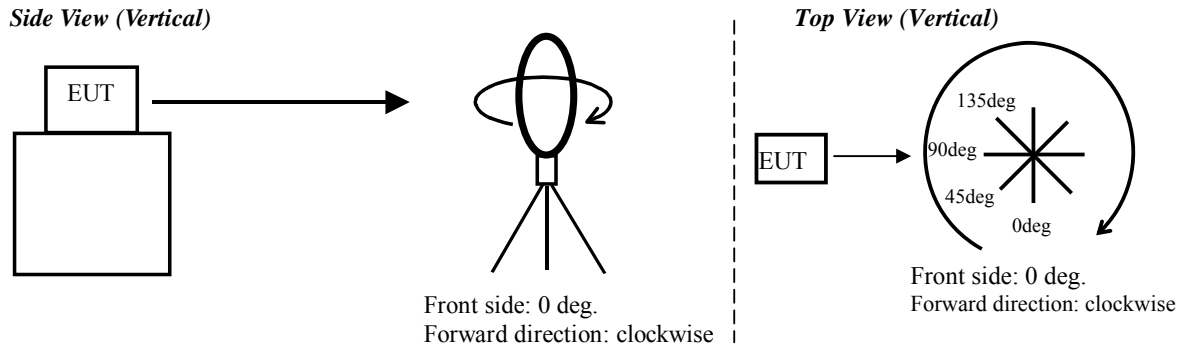
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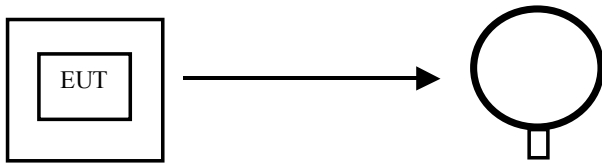
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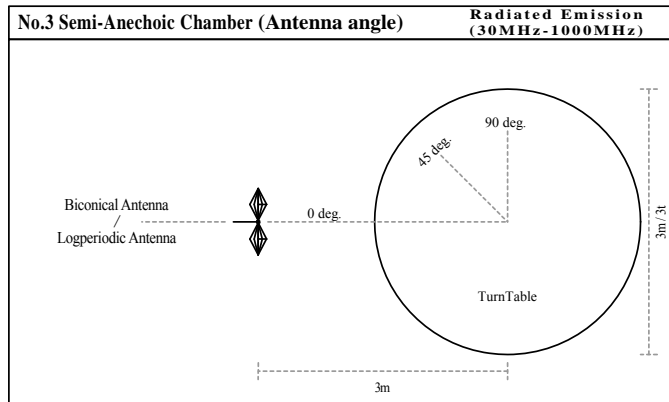
**Figure 1: Direction of the Loop Antenna**



*Top View (Horizontal)*



Antenna was not rotated.



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## **SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Summary of the test results: Pass

## **SECTION 8: Frequency tolerance**

### **Test procedure**

The measurement was performed in the antenna height to gain the maximum of Electric field strength.  
The temperature test was started after the temperature stabilization time of 30 minutes.

Summary of the test results: Pass

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

Page 13 : Conducted emission  
Page 14 - 15 : Radiated emission

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

Page 16 : Conducted emission  
Page 17 - 19 : Radiated emission  
17 : Fundamental and Outside the Allocated bands  
18 - 19 : Spurious emission  
Page 20 : Bandwidth  
Page 21 - 23 : Frequency tolerance

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

Page 24 : Test instruments

### **APPENDIX 4: Similar model description**

Page 25 : Similar model description

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