



RADIO TEST REPORT

Test Report No.: 28IE0218-YK-B

Applicant : RICOH COMPANY, LTD.
Type of Equipment : Full-color MFP
Model No. : Aficio MP C4500
Aficio MP C3500
FCC ID : BBP- RFAPL01
Test regulation : FCC Part15 Subpart C: 2008
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.

Date of test: May 12 and 13, 2008

Tested by: M. Hosaka
Makoto Hosaka

&

T. Imamura
Toyokazu Imamura

Approved by: O. Watatani
Osamu Watatani
Manager of Yamakita EMC Lab.

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1 Applicant information

Company Name : RICOH COMPANY, LTD.
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Telephone Number : +81-46-292-6870
Facsimile Number : +81-46-231-9183
Contact Person : Shinji Okada

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

2.1 Identification of E.U.T.

Type of Equipment : Full-color MFP
Model No. : Aficio MP C4500
Aficio MP C3500
Serial No. : L906030053
Rating : AC120±10%V, 50/60Hz
Country of Mass-production : China
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : May 12, 2008

2.2 Product description

Model: Aficio MP C4500 / Aficio MP C3500 (referred to as the EUT in this report) is a Full-color MFP.
The difference between Model: Aficio MP C4500 and Model: Aficio MP C3500 is printing speed.

Aficio MP C4500: 45 pages per minute

Aficio MP C3500: 35 pages per minute

Clock frequency: 798.8MHz

	RFID	Bluetooth
Equipment type	Transceiver	Transceiver
Frequency of operation	13.56MHz	2402-2480MHz
Clock frequency	13.56MHz	16MHz
Type of modulation	ASK 100%	FHSS
Antenna type	Print pattern antenna	Chip
Antenna connector type	None	None
ITU code	A1D	F1D
Operation temperature range	+10 ~ +32 deg. C.	0 ~ +40 deg.C.

FCC Part15.31 (e)

Host device (Full-color MFP) provides the Bluetooth module with stable power supply, and the power is not changed when voltage of the Full-color MFP is varied. Therefore, the equipment complies power supply regulation.

FCC Part15.203

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

FCC Part15.247 (i)

(i) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307 (b)(1) of this chapter. Please refer to the application documents of FCC ID: NXXBL-565. Model: BL-565 is the original model of BL-631.

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3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2008 final revised on March 24, 2008
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

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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 Section 15.207	-	N/A	21.4dB (0.1991MHz, Tx 2402MHz, QP)	Complied
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (a)(1)	-	Excluded *1	N/A	N/A
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (a)(1)	-	Excluded *1		N/A
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (a)(1)(iii)	-	Excluded *1		N/A
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (a)(1)(iii)	-	Excluded *1		N/A
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (b)(1)	-	Excluded *1		N/A
Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.209 & Section 15.247 (d)	Conducted	Excluded *1		N/A
Band edge compliance	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.247 (d)	Radiated	N/A	See data	Complied
Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section 15.209 & Section 15.247 (d)	Radiated	N/A	1.5dB (641.13MHz, Vertical, Tx 2441MHz, QP)	Complied

*1) These items were tested previously with Bluetooth module, BL-565 alone (FCC ID: NXXBL-565). The results were described in the test report, G0M20103-4306-T-47 published by ELECTRONIC TECHNOLOGY SYSTEM DR. GENZ GMBH (ETS). The Bluetooth Compact Flash Card BL-565 has been certificated on October 25, 2002. After then Change in identification based on FCC Section 2.933 was applied and the changes were model No., trade name and FCC ID. Refer to the information on the FCC web site. (New FCC ID: NXXBL-631)

*2) Test results for RFID Module were described in the test report 25LE0014-YK-1, published by UL Apex Co., Ltd. (The company name was changed from "UL Apex Co., Ltd." to "UL Japan, Inc." on April 26, 2007.)

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

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3.3 Addition to standard

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.

	No.1 open site	No.2 open site	No.1 anechoic chamber
Conducted emission			
150kHz-30MHz	2.8 dB	2.8 dB	2.8 dB
Radiated emission (3m)			
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB
1GHz<	5.7 dB	5.7 dB	5.7 dB

Conducted emission

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

Radiated emission

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

3.5 Test location

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NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).

IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on February 27, 2008 (Registration No.: 466226).

IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (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		

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

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4 System test configuration

4.1 Justification

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

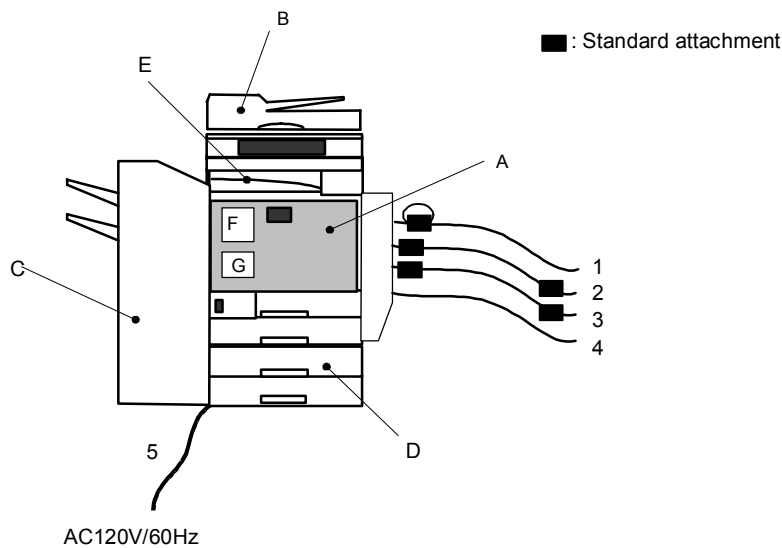
Test item	Operating mode	Tested frequency
Conducted emission	Transmitting (DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Spurious emission (Radiated) & Band edge compliance	Transmitting (DH5), Payload: PRBS9 -Hopping ON/Inquiry -Hopping OFF	Spurious emission: 2402MHz, 2441MHz, 2480MHz Band edge compliance:
	Transmitting (DH5), Payload: PRBS9	2402MHz, 2480MHz

*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 125mW of AFH mode was used for the test. The EUT has no EDR mode.

* RFID is also run into Transmitting (13.56MHz) mode.

Four RFID modules which have the same specification are mounted in the equipment and they don't have simultaneous transmitting function. They were previously checked and the one in which the maximum emission occurred was chosen. ID tag was mounted in the ribbon inside of the EUT to communicate with each module.

4.2 Configuration of tested system



* 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	FCC ID (Remark)
A	Full-color MFP	Aficio MP C4500 (Aficio MP C3500)	L906030053	RICOH	BBP-RFAPL01 (EUT)
B	Document Feeder	DF 3010	60211076	RICOH	-
C	Booklet Finisher	SR 3000	3L41-118044	RICOH	-
D	Paper Bank	PB 3000	90157	RICOH	-
E	Bridge Unit	BU 3000	90161	RICOH	-
F	USB	USB Host Interface Unit Type A	60100052	RICOH	-
G	Bluetooth Compact Flash Card	BL-63101	000A-4F-020157	Brain Boxes	NXXBL-631

* RFID modules are installed in the Full-color MFP.

List of cables used *1)

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	100BASE-Tx cable	5.0	Unshielded	Unshielded	-
2	USB cable	2.5	Shielded	Shielded	-
3	USB cable	2.5	Shielded	Shielded	-
4	USB cable	2.5	Shielded	Shielded	-
5	Power cable	2.0	Unshielded	Unshielded	-

*1) All cables used for the measurement are exclusive use or marketed.

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5 Conducted emissions

5.1 Operating environment

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

Temperature : See test data
Humidity : See test data

5.2 Test configuration

EUT was placed on a carpet for insulation above the ground plane. EUT was located 80cm from LISN and excess AC cable was bundled in center.

A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz

5.4 Test procedure

The EUT was connected to a LISN (AMN). An overview sweep with peak detection has been performed. The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV
IF Bandwidth: 10kHz

5.5 Results

Summary of the test results : Pass

Date : May 13, 2008 Test engineer : Makoto Hosaka

6 Out of band emissions (Radiated)

6.1 Operating environment

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

6.2 Test configuration

EUT was placed on a wooden platform of nominal size, 0.5m by 0.5m, raised 10cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

6.3 Test conditions

Frequency range : 30MHz - 26.5GHz
Test distance : 3m (30MHz-18GHz), 1m (18-26.5GHz)

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m or 1m. 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.

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

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz AV RBW: 1MHz/VBW: See data
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn

6.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

6.6 Results

Summary of the test results : Pass
No noise was detected above the 5th order harmonics.

Date : May 12 and 13, 2008 Test engineer : Toyokazu Imamura and Makoto Hosaka

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APPENDIX 1: Photographs of test setup

Page 12 : Conducted emission

Page 13 : Radiated emission

APPENDIX 2: Test Data

Page 14 - 18 : Conducted emission

Page 19 - 27 : Out of band emissions (Radiated)

Page 28 : Duty factor

APPENDIX 3: Test instruments

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