



# EMI TEST REPORT

Test Report No. : 26FE0182-HO-1a

Applicant : KYOCERA MITA Corporation  
Type of Equipment : RFID Reader/Writer  
Model No. : B5J-0451  
Test standard : FCC Part 15 Subpart C : 2006  
Section 15.207 and 15.225  
FCC ID : E52B5J0451  
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
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 client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test:

March 9 to April 1, 2006

Tested by:

Mitsuru Fujimura  
EMC Services

Approved by :

Naoki Sakamoto  
Group leader of EMC Services



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.

\*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://ulapex.jp/emc/nvlap.htm>

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## **SECTION 1: Client information**

Company Name : KYOCERA MITA Corporation  
Address : 2-28, 1-Chome, Tamatsukuri, Chuo-ku, Osaka, Japan.  
Telephone Number : +81-6-6764-3333  
Facsimile Number : +81-6-6764-3847  
Contact Person : Yutaka Shigemura

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

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

Type of Equipment : RFID Reader/Writer  
Model No. : B5J-0451  
Serial No. : 059  
Rating : DC 3.3V/0.1A  
Country of Manufacture : Japan  
Receipt Date of Sample : March 9, 2006  
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: B5J-0451 is the RFID Reader/Writer.

Equipment Type : Transceiver  
Frequency of Operation : 13.56 MHz  
Type of modulation : ASK  
Antenna Type : PWB Pattern Antenna  
Method of Frequency Generation : Crystal

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

The EUT provides the voltage (DC3.3V) to the RF part. Testing of the variation of the input power was performed, and it was confirmed that the EUT complies the requirement.

### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the EUT and its antenna are mounted inside of the end product. 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 Part15 Subpart C : 2006  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.225 : Operation within the band 13.110-14.010MHz

**3.2 Procedures and results**

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	<FCC>ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC>RSS-Gen 7.2.2	<FCC>Section 15.207 <IC>RSS-Gen 7.2.2	-	N/A	20.5dB (0.154MHz, QP, L)	Complied
2	Electric Field Strength of Fundamental Emission	<FCC>ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.6, 4.9	<FCC>Section 15.225(a) <IC>RSS-210 A2.6	Radiated	N/A	79.3dB (13.56MHz, 90deg)	Complied
3	Spectrum Mask	<FCC>ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7, 4.9	<FCC>Section 15.225(a)(b)(c)(d) <IC>RSS-210 A2.6	Radiated	N/A	44.6dB (13.11MHz/14.01MHz, 90deg.)	Complied
4	Electric Field Strength of Spurious Emission	<FCC>ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7, 4.9	<FCC>Section15.209 and 15.225 (d) <IC>RSS-210 A2.6	Radiated	N/A	1.8dB (40.658MHz, Vert., QP)	Complied
5	Frequency Tolerance	<FCC>ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.5	<FCC>Section15.225 (e) <IC>RSS-210 A2.6	Conducted	N/A	See data	Complied
6	-26dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Reference data <IC> -	Radiated	N/A *1)	N/A	Complied

Note: UL Apex's EMI Work Procedures No.QPM05 and QPM15.  
These tests were performed without any deviations from test procedure except for additions or exclusions.  
\*1) This test was performed instead of 20dB Bandwidth data.

### 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	<IC>RSS-Gen 4.4.1	<IC>RSS-Gen 4.4.1	Conducted	N/A	N/A	Complied
2*	APPENDIX 4: Confirmation Test Data	<FCC>Section 15.225	<FCC>Section 15.225	Radiated	N/A	See data	Complied

\*EUT (RFID module) is not enclosed with the shield. Therefore, the confirmation test was made with EUT installed in the host device (Printer).

### 3.4 Uncertainty

#### Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 2.6$ dB.  
The data listed in this test report has enough margin, more than the site margin.

#### Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.59$ dB(3m)/  $\pm 4.58$ dB(10m).  
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 4.62$ dB(3m)/  $\pm 4.60$ dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 5.27$ dB.  
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 (with a 95% confidence level) for this test is  $\pm 3.0$ dB.

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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	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 measurement room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 measurement room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 shielded room	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	N/A	-
No.6 preparation room	-	-	4.75 x 5.4 x 3.0m	N/A	-
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	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

### 3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

**4.1 Operating Modes**

The EUT was operated in a manner similar to typical use during the tests.

The mode used for testing: Continuous transmitting mode

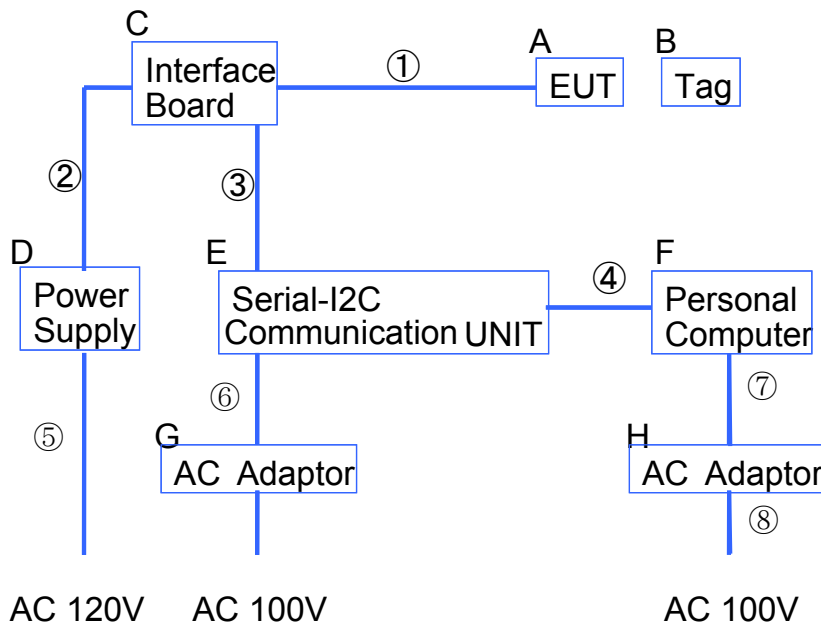
Frequency Tolerance:

- Temperature for the extreme tests : -30 deg.C.(minimum) to + 50deg.C.(maximum)
  - Voltage for the extreme tests : DC 2.93(minimum) to DC3.8V.(maximum)
- \*DC2.93V is a Minimum operating voltage (for EUT specification)*

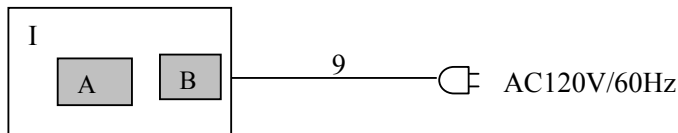
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

**Configuration and peripherals**

**Standalone of Module Radiated Emission and Conducted emission**



**APPENDIX 4: Confirmation test data**



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	FCC ID
A	RFID Reader/Writer	B5J-0451	059	OMRON	E52B5J0451 (EUT)
B	RFID Tag	V720-S-D13P50F	-	OMRON	EUT
C	Interface Board	-	-	OMRON	-
D	Power supply	HWS15-3/A	2P6-612CAC- 0007W3705	DENSEI LAMBDA	-
E	Serial-I2C UNIT	MIIC-203	2193	TOYO	-
F	PC	2609-31J	BA-ZFFHL	IBM	-
G	AC Adaptor	3A-161WP05	DMS050260-P6P-SZ	TOYO	-
H	AC Adaptor	-	FRU02K654811S02 K6547ZJ16B	IBM	-
I	Printer	FS-C5010DN	SPL5900043	KYOCERA MITA	-

**List of cables used**

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Interface Cable	0.3	N	N	-
2	DC Power Cable	0.8	N	N	-
3	I2C Cable	1.3	Y	Y	-
4	Serial Cable	0.2	Y	Y	-
5	AC Power Cable	3.0	N	N	-
6	DC Power Cable	1.8	N	N	-
7	DC Power Cable	1.8	N	N	-
8	AC Power Cable	1.8	N	N	-
9	AC Power Cable	2.6	N	N	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

Test place : No.1 semi anechoic chamber  
Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a urethane platform size, 1.0m by 0.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT and its peripherals was aligned and 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/AMN 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 forth 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/ an AMN to the input power source. All unused 50ohm connectors of the LISN/ AMN were resistively terminated in 50ohm when not connected to the measuring equipment. A drawing of the set up is shown in the photos of APPENDIX 1.

### **5.3 Test conditions**

Frequency range : 0.15MHz – 30MHz  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in the semi Anechoic Chamber. The EUT was connected to a Line Impedance Stabilization Network (LISN)/ Artificial Mains Network (AMN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, with an average detector. The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : QP and AV  
IF Bandwidth : 9kHz

### **5.5 Test result**

Summary of the test results : Pass

Date : April 1, 2006                      Test engineer : Mitsuru Fujimura

**SECTION 6: Radiated emission (Fundamental, Spurious Emission and Spectrum Mask)**

**6.1 Operating environment**

Test place : No.1 semi anechoic chamber  
Temperature : See data  
Humidity : See data

**6.2 Test Procedure**

The Radiated Electric Field Strength intensity has been measured on No.1 semi anechoic chamber 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 each antenna angle 0deg. , 45deg. and 90deg.

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 a QP, PK, and AV detector.  
The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

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

\* 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])

**6.3 Test result**

Summary of the test results : Pass

Date : March 15, 31, and April 1, 2006                      Test engineer : Mitsuru Fujimura

## **SECTION 7: -26dB Bandwidth and 99% Occupied Bandwidth**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 8: Frequency Tolerance**

### **Test Procedure**

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

Test data : APPENDIX 3  
Test result : Pass