



RADIO TEST REPORT

Test Report No.: 26HE0252-HO-A-1

Applicant : Ishino Seisakusho Co., Ltd.
Type of Equipment : RFID Reader/Writer
Model No. : C63
Test standard : FCC Part 15 Subpart C : 2006
Section 15.207 and 15.225
FCC ID : T6ZC63
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.
4. The test results in this report are traceable to the national or international standards.

Date of test:

April 26 to June 20, 2006

Tested by:

Mitsuru Fujimura
EMC Services

Norihisa Hashimoto
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Approved by :

Naoki Sakamoto
Group Leader of
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SECTION 1: Client information

Company Name	:	Ishino Seisakusho Co., Ltd.
Address	:	3-5 Yatsukaho Hakusan-shi Ishikawa, 924-0838 Japan
Telephone Number	:	+81-76-274-6561
Facsimile Number	:	+81-76-274-6565
Contact Person	:	Takashi Nakano

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

2.1 Identification of E.U.T.

Type of Equipment	:	RFID Reader/Writer
Model No.	:	C63
Serial No.	:	1
Rating	:	AC120V/60Hz
Country of Manufacture	:	Japan
Receipt Date of Sample	:	April 26, 2006
Condition of EUT	:	Production model
Modification of EUT	:	No modification by the test lab.

2.2 Product Description

Model No: C63 is the RFID Reader/Writer
The clock frequency of EUT is 10MHz.

Equipment Type	:	Transceiver
Frequency of Operation	:	13.56 MHz
Type of modulation	:	ASK
Power control	:	No
Antenna Type	:	Loop Antenna
Method of Frequency Generation	:	Crystal
Operating voltage (inner)	:	DC5V

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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

FCC 15.31 (e)

Testing of the variation of the input power (85% and 115% of AC120V) was performed. Please refer to the page 25.

FCC Part 15.203 Antenna requirement

The EUT has a unique antenna connector (PH connector made by JST). Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin*0)	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements & ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.207	-	N/A	5.2dB 0.21851MHz L, AV	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(a)	Radiated	N/A	37.8MHz QP Without Tag	Complied
3	Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.225(b)(c)	Radiated	N/A	16.7dB 13.55300MHz QP Without Tag	Complied
4	-20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.215(c)	Radiated	N/A	N/A	Complied
5	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.209, Section 15.225 (d)	Radiated	N/A	0.5dB 40.690MHz Vert., QP	Complied
6	Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.225(e)	Radiated	N/A	N/A	Complied

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

*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

*These tests were performed without any deviations from test procedure except for additions or exclusions.

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3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	RSS-Gen 4.4.1	Radiated	N/A	N/A	Complied

3.4 Uncertainty

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is ± 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 Loop antenna is ± 4.41 dB(3m)/ ± 4.39 dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.59 dB(3m)/ ± 4.58 dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 4.62 dB(3m)/ ± 4.60 dB(10m).

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

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

3.5 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications
FCC Part 15 Subpart C: 2006 Section 15.225.

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3.6 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	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
No.4 shielded 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 measurement 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, No.2, No.3, and No.4 semi-anechoic chambers and No.7 shielded room.

3.7 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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 is used:

1. Transmitting mode with Tag (worst case)*
 - Conducted Emission
 - Electric Field Strength of Spurious Emission (above 30MHz)
 - -20dB Bandwidth
 - Frequency Tolerance
 - 99% Occupied Bandwidth

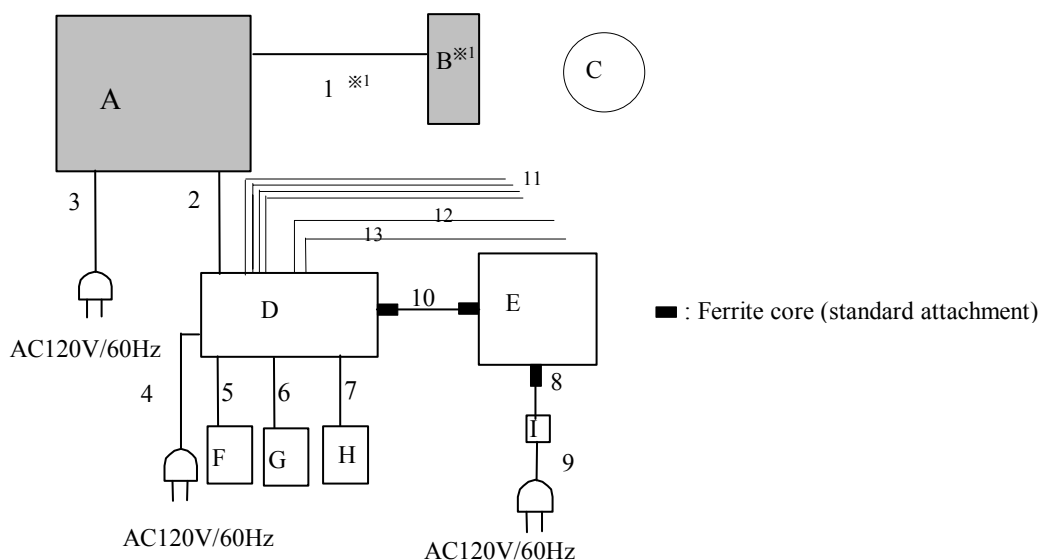
* The mode was the worst case for the above test items.

2. Transmitting mode with Tag /without Tag
 - Electric Field Strength of Fundamental Emission
 - Spectrum Mask
 - Electric Field Strength of Spurious Emission (below 30MHz)

Frequency Tolerance:

Temperature for the extreme tests	:	-20 deg.C.(minimum) to + 50deg.C.(maximum)
Voltage for the extreme tests	:	AC120V +/-15%

4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

※1 Dummy load (50 ohm) was used instead of the antenna (No. B) and Cable (No. 1) for the measurement of the conducted emission of fundamental.

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	RFID Reader/Writer	C63	1	TAKAYA Corp.	EUT
B	Antenna	TR3-CA009	06030016	TAKAYA Corp	EUT
C	Tag	-	01	-	-
D	PC	PCMI25XLZETMBG	59000041A	NEC	-
E	LCD Monitor	LCP-A151F-T	USY1001589GD	I.O DATA	-
F	KeyBoard	KB-3920	5H09006586B	-	-
G	Mouse	808-897327-102-A	5701687	NEC	-
H	Earphone	-	-	-	-
I	AC adapter	LSE9901B1260	A30510040821	LISHIN INTERNATINAL ENTERPRISE CORP.	

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	3.0	Unshielded	Unshielded	-
2	R232C Cable	2.0	Unshielded	Unshielded	-
3	AC Cable	2.0	Unshielded	Unshielded	-
4	AC Cable	2.0	Unshielded	Unshielded	-
5	KeyBoard Cable	2.0	Unshielded	Unshielded	-
6	Mouse Cable	2.0	Unshielded	Unshielded	-
7	Earphone Cable	1.8	Unshielded	Unshielded	-
8	DC Cable	1.45	Unshielded	Unshielded	One Ferrite core (standard attachment)
9	AC Cable	1.7	Unshielded	Unshielded	-
10	Monitor Cable	1.65	Unshielded	Unshielded	Two Ferrite cores (standard attachment)
11	Four USB Cables	1.5	Unshielded	Unshielded	-
12	LAN Cable	3.0	Unshielded	Unshielded	-
13	Printer Cable	1.5	Unshielded	Unshielded	-

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SECTION 5: Conducted emission

5.1 Operating environment

Test place : No.4 semi anechoic chamber.
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1m by 1.5m, 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 28 and June 20, 2006 Test engineer : Mitsuru Fujimura

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

6.1 Operating environment

The test was carried out in a No.4 semi Anechoic Chamber

Temperature : See data
Humidity : See data

Test Procedure

The Radiated Electric Field Strength intensity has been measured in a 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])

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SECTION 7: -20dB 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: 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 9: 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