



RADIO TEST REPORT

Test Report No. : 28KE0126-HO-01-C-R1

Applicant : NIDEC SANKYO CORPORATION
Type of Equipment : Magnetic and Contactless IC card reader writer
Model No. : ICI3Q8-5293
Test regulation : FCC Part 15 Subpart C : 2008
Section 15.207 and 15.225
FCC ID : WJ6-3Q8529301A
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with 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.
6. Original test report number of this report is 28KE0126-HO-01-C.

Date of test:

July 22 and 23, 2008

Tested by:



Akio Hayashi
EMC Services



Satofumi Matsuyama
EMC Services

Approved by :



Makoto Kosaka
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://uljapan.co.jp/emc/nvlap.htm>

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b (09.01.08)

CONTENTS	PAGE
SECTION 1: Customer information	3
SECTION 2: Equipment under test (E.U.T.)	3
SECTION 3: Test specification, procedures & results	4
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Conducted emission	10
SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)	11
SECTION 7: 20dB Bandwidth.....	12
SECTION 8: Frequency Tolerance	12
SECTION 9: 99% Occupied Bandwidth	12
APPENDIX 1: Photographs of test setup.....	13
Conducted emission	13
Radiated emission (below 30MHz).....	14
Radiated emission (above 30MHz).....	15
APPENDIX 2: Data of EMI test	16
Conducted emission	16
Radiated emission(Fundamental emission and Spectrum Mask)	17
Radiated emission (Spurious emission : below 30MHz).....	18
Radiated emission (Spurious emission: above 30MHz).....	19
20dB Bandwidth.....	20
99% Occupied Bandwidth	21
Frequency Tolerance	22
APPENDIX 3: Test instruments.....	23
APPENDIX 4: Transmission Data Specification	24

SECTION 1: Customer information

Company Name	:	NIDEC SANKYO CORPORATION
Address	:	5329 Shimosuwa-machi Suwa-gun Nagano 393-8511, Japan
Telephone Number	:	+81-266-27-4715
Facsimile Number	:	+81-266-27-4620
Contact Person	:	Ikuro Kuribayashi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Magnetic and Contactless IC card reader writer
Model No.	:	ICI3Q8-5293
Serial No.	:	8050006
Rating	:	AC 100V to 240V / 50Hz or 60Hz
Receipt Date of Sample	:	June 24, 2008
Country of Mass-production	:	Japan
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: ICI3Q8-5293 (referred to as the EUT in this report) is the Magnetic and Contactless IC card reader writer.

Feature of EUT	:	Magnetic card reader writer, and Contactless IC card reader writer. Compact type (Hereafter, refer as IMCRW. Customer's main system as HOST) IMCRW has a modular construction. Universal Serial Bus (USB) Interface. The software interface is held in Flash PROM(F-ROM) and downloadable from the HOST. The down loading software has the security.
----------------	---	---

Clock frequency(ies) in the system	:	CPU: 16.00MHz
------------------------------------	---	---------------

Equipment Type	:	Transceiver
Frequency of Operation	:	13.56MHz
Type of Modulation	:	ASK
Mode of operation	:	Simplex
Antenna Type	:	Loop Antenna(PCB Pattern)
Antenna Connector Type	:	U.FL
Method of Frequency Generation	:	Crystal
Operating voltage (Inner)	:	AC100-240V(DC5V)

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C: 2008 , final revised on May 19, 2008
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)

This EUT provides stable voltage(DC5.0V) constantly to RF Module 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

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC>RSS-Gen 7.2.2	Section 15.207 <IC>RSS-Gen 7.2.2	-	N/A	[AV] 8.9dB 0.80003MHz, N 13.56000MHz, L [QP] 18.9dB 0.80003MHz, N 13.56000MHz, L	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	Section 15.225(a) <IC>RSS-210 A2.6	Radiated	N/A	63.5dB 13.56000MHz, QP, 0deg	Complied
3	Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section 15.225(b)(c) <IC> RSS-210 A2.6	Radiated	N/A	41.9dB 13.55300MHz, QP, 0deg	Complied
4	20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	Section 15.215(c) <IC> -	Radiated	N/A	N/A	N/A
5	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.9, 4.11	Section 15.209, Section 15.225 (d) <IC>RSS-210 A2.6	Radiated	N/A	6.8dB 160.016MHz, QP, Vertical	Complied
6	Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7	Section 15.225(e) <IC> RSS-210 A2.6	Radiated	N/A	See data	Complied

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

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

3.3 Addition to standards

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

3.4 Uncertainty

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

Conducted emission test

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

Radiated emission test(3m)

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

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is ±3.0dB.

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

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	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, Test instruments and Data of EMI, Transmission Data Specification

Refer to APPENDIX 1 to 4.

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 : Transmitting Mode (13.56MHz) without Tag
 * Refer to APPENDIX 4 for Transmission Data Specification.

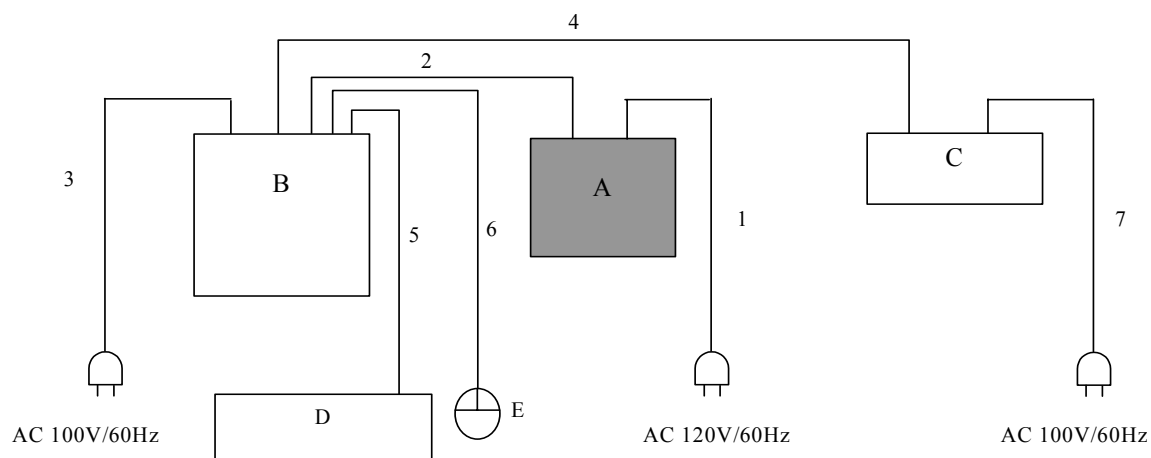
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

Frequency Tolerance:

Temperature for the extreme tests : -30 deg.C.(minimum) to + 50deg.C.(maximum)
 * -30 deg.C. is for IC application (RSS-Gen 4.7 requirement).

Voltage for the extreme tests : DC 5.0V
 * This EUT provides stable voltage(DC5.0V) constantly to RF
 Module regardless of input voltage.

4.2 Configuration and peripherals



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

* This test was performed without Tag since it was the worst condition according to the measurement result compared “ with Tag ” to “ without Tag ”.

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Magnetic and Contactless IC card reader writer	ICI3Q8-5293	8050006	NIDEC SANKYO CORPORATION	EUT
B	PC	PC-MY25XRZEF	51015071A	NEC	-
C	Monitor	E173FPC	59T-197C	DELL	-
D	Keyboard	KB-3920	4219104087B	NEC	-
E	Mouse	ECM-S5002/R64-1229-01	4Y15914	NEC	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	3.0	Unshielded	Unshielded	-
2	USB Cable	3.0	Shielded	Shielded	-
3	AC Cable	2.0	Unshielded	Unshielded	-
4	Display Cable	1.0	Shielded	Shielded	-
5	Keyboard Cable	1.5	Unshielded	Unshielded	-
6	Mouse Cable	1.7	Unshielded	Unshielded	-
7	AC Cable	3.0	Unshielded	Unshielded	-

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

SECTION 5: Conducted emission

5.1 Operating environment

Test place	: No.3 semi anechoic chamber.
Temperature	: See data
Humidity	: See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m 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. The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a horizontal conducting plane 4.0 x 4.0m and a vertical conducting plane 2.0 x 2.0m in a semi Anechoic Chamber. Photographs of the set up are shown in 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

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

6.1 Operating environment

The test was carried out in a No.3 semi Anechoic Chamber

Temperature : See data
Humidity : See data

6.2 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, Used antenna: Loop

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, Used antenna: Biconical (30-300MHz), Logperiodic (300-1000MHz)

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

* Frequency: 0.07047MHz(Antenna 0deg) was also measured with QP, and Frequency: 13.56MHz(Antenna 0deg) was also measured with PK, to compare the level.

The test was made on EUT at the normal use position.

* FCC Part 15 Section 15.31 (f)(2) / IC RSS-Gen 4.11 (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

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

SECTION 7: 20dB Bandwidth

Test Procedure

The measurement was performed under the condition which has the maximum Electric field strength.

Test data	: APPENDIX 2
Test result	: Pass

SECTION 8: Frequency Tolerance

Test Procedure

The measurement was performed with Electric field strength using a Universal Counter.

Test data	: APPENDIX 2
Test result	: Pass

SECTION 9: 99% Occupied Bandwidth

Test Procedure

The measurement was performed under the condition which has the maximum Electric field strength.

Test data	: APPENDIX 2
Test result	: Pass