



# EMI TEST REPORT

**Test Report No. : 24LE0207-HO**

**Applicant** : OMRON Corporation  
**Type of Equipment** : Carrier ID Reader / Writer (RF-ID)  
**Model No.** : V640-HAM12 (Amplifier Unit)  
V640-HS62 (CIDRW Head)  
**Test standard** : FCC Part 15 Subpart B ClassA: 2004  
FCC Part 15 Subpart C : 2004  
Section 15.207 and 15.209  
**FCC ID** : E4E6CYCIDV6400304  
**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.

**Date of test:**

June 7 and 9, 2004

**Tested by:**

Makoto Kosaka  
EMC Service

**Tested by:**

Hiroka Umeyama  
EMC Service

**Approved by :**

Naoki Sakamoto  
Group Leader of  
EMC Service

**UL Apex Co., Ltd.**

**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(10.04.03)

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## **SECTION 1: Client information**

Company Name : OMRON Corporation  
Brand or Trade name : OMRON  
Address : 3-2 Narutani, Nakayama-cho, Ayabe-shi, Kyoto, 623-0105 Japan  
Telephone Number : +81-773-42-6662  
Facsimile Number : +81-773-43-0346  
Contact Person : Yoshito Okuno

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

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

Type of Equipment : Carrier ID Reader / Writer (RF-ID)  
Model No. : V640-HAM12 (Amplifier Unit) / V640-HS62 (CIDRW Head)  
Serial No. : 2/22  
Rating : DC 24.0V  
Country of Manufacture : Japan  
Receipt Date of Sample : August 4, 2004  
Condition of EUT : Production Prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)

### **2.2 Product Description**

Model No: V640-HAM12 and V640-HS62 is the Carrier ID Reader / Writer (RF-ID).  
The clock frequency of EUT is 16.0MHz (CPU).

Equipment Type : Transceiver  
Frequency of Operation : 134.2 kHz  
Type of modulation : ASK  
Antenna Type : Loop Coil Antenna  
Method of Frequency Generation : Resonator  
Operating Temperature : 0 deg. C. to +40 deg. C.

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

This EUT provides stable voltage (DC 24.0V) constantly to RF Module regardless of input voltage.  
DC Power Supply also supplied this EUT with stable voltage (DC 24.0V) constantly.  
Therefore, this EUT complies with the requirement.

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

The device that has an external and particular antenna connector, and its installation is to be done by the professionals;  
This EUT has the external (particular) antenna connector, and the installation is to be done by the professionals. Therefore,  
the equipment complies with the antenna requirement of Section 15.203.

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**Head Office EMC Lab.**

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

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**SECTION 3: Test specification, procedures & results**

**3.1 Test Specification**

Test Specification : FCC Part15 Subpart B Class A : 2004  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

Test Specification : FCC Part15 Subpart C : 2004  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional  
Radiators  
Section 15.207 Conducted limits  
Section 15.209 Radiated emissions limits, general requirements

**3.2 Procedures and results**

No.	Item	Test Procedure	Limit	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Class A[FCC15B] Section 15.207[FCC15C]	-	N/A	5.0dB 17.19MHz L	Complied
2	Radiated Emission	ANSI C63.4:2003 8. Radiated emission measurements	Class A[FCC15B]*1 Section 15.209[FCC15C]*2	-	N/A	3.6dB 90.585MHz Vertical	Complied
3	-20dB Bandwidth	ANSI C63.4:2003 Annex H.6 Occupied bandwidth measurements	Reference data	-	N/A	N/A	N/A

Note: UL Apex's EMI Work Procedures No.QPM05.  
\*1: EUT is declared to be used under the Industrial environment according to the product description. Therefore, the test was complied with Class A based on Section 15.3(h).  
\*2: Based on Section 15.33(a)(1), the test was made on the Frequency range from the highest fundamental frequency to the tenth harmonic of the highest fundamental frequency.

**Uncertainty:**  
\*In case of the margin below the EMC Head Office's uncertainty.  
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Conducted Emission  
The measurement uncertainty (with a 95% confidence level) for this test is ±1.3dB.

Spurious Emission (Radiated)  
The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is ±1.9dB(3m)/ ±1.8dB(10m).  
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB(3m)/ ±4.7dB(10m).  
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB(3m)/ ±3.8dB(10m).  
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.

Other test except Conducted Emission and Spurious Emission (Radiated)  
The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.

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

### 3.3 Test Location

UL Apex Co., Ltd. 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

	Listed date (for FCC)	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	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 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.

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

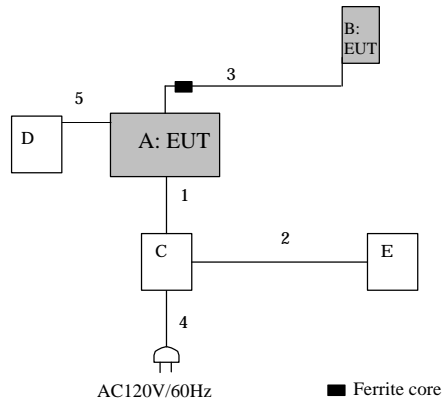
Refer to APPENDIX 1 to 3.

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

### 4.1 Operating Modes

The mode is used : Communication mode (Transmitting-Receiving) 134.2kHz  
\*All modes of operation was confirmed, and the worse case emissions were generated in the communication mode. So, the data was measured with the communication mode only.

### 4.2 Configuration and peripherals



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

#### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remarks
A	Carrier ID Reader / Writer (Amplifier Unit)	V640-HAM12	2	OMRON	E4E6CYCIDV6400304	EUT
B	Carrier ID Reader / Writer (CIDRW Head)	V640-HS62	22	OMRON	E4E6CYCIDV6400304	EUT
C	Power Supply	S82K-03024	-	OMRON	-	-
D	Carrier ID Reader / Writer (Amplifier Unit)	V640-HAM12	3	OMRON	-	-
E	Personal Computer	Type 2644	97-0830Y 12199	IBM	DOC	-

#### List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	DC Cable	1.8	N	Polyvinyl chloride
2	RS232C Cable	2.0	Y	Polyvinyl chloride
3	Antenna Cable	2.0	Y	Coaxial
4	AC Cable	2.0	N	Polyvinyl chloride
5	DC Cable	0.2	N	Polyvinyl chloride

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

Test place : No.2 semi anechoic chamber  
Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m 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. 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 No.2 semi Anechoic Chamber. 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 : Top of Polyurethane  
EUT operation mode : Communication mode (Transmitting-Receiving) 134.2kHz

### **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

**Test data : APPENDIX 3**  
**Test result : Pass**

**SECTION 6: Radiated emission**

**6.1 Operating environment**

Test place : No.1 and No.2 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 and No.2 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 (or, noise levels) was (or were) measured at each position of all three axis A, B and C, and the position that has the maximum noise was determined.

With the position, the noise levels of all the frequencies were measured.

\* 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])

**Test data : APPENDIX 3**

**Test result : Pass**

**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**

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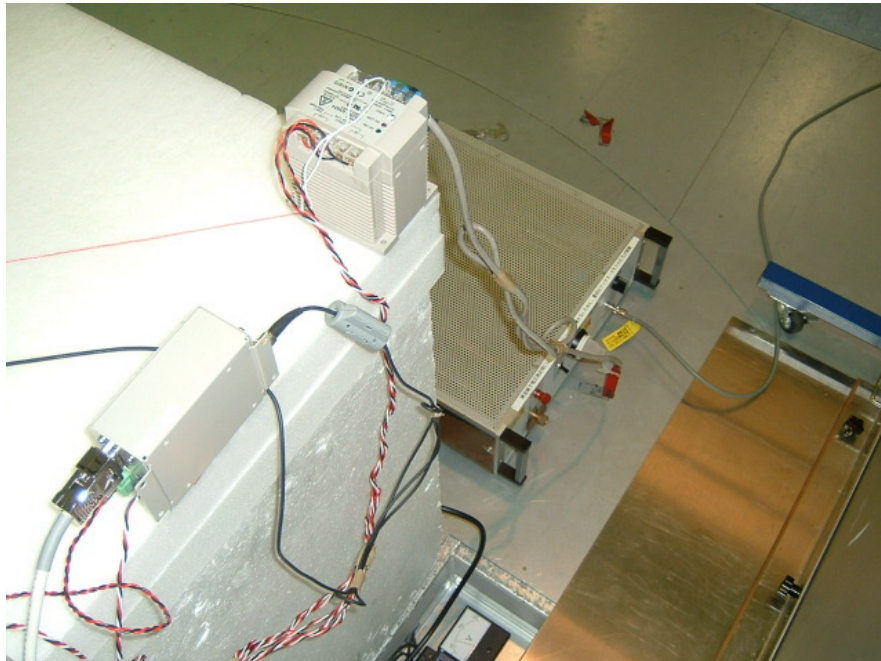
**APPENDIX 1: Photographs of test setup**

**Conducted emission**

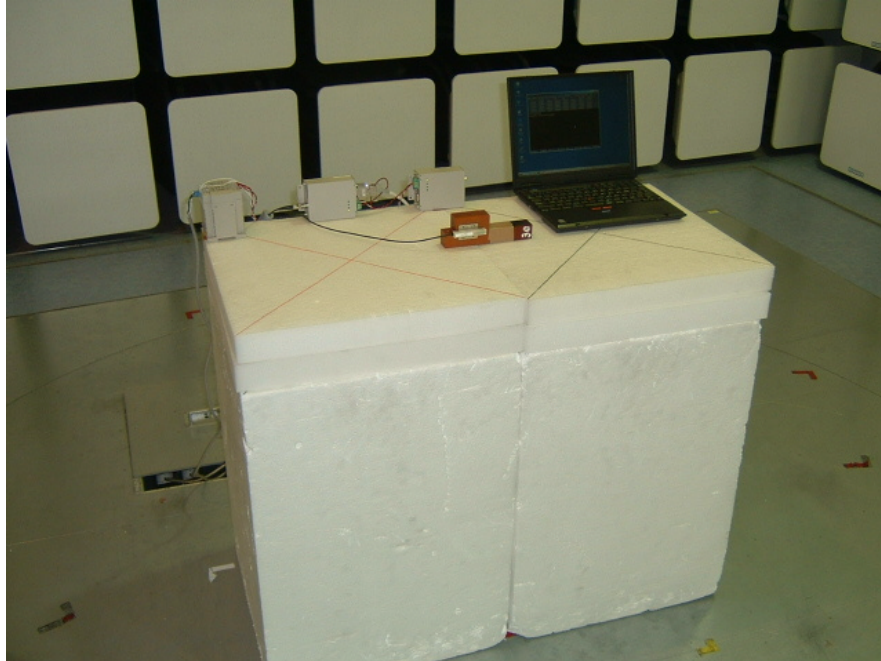
**Front**



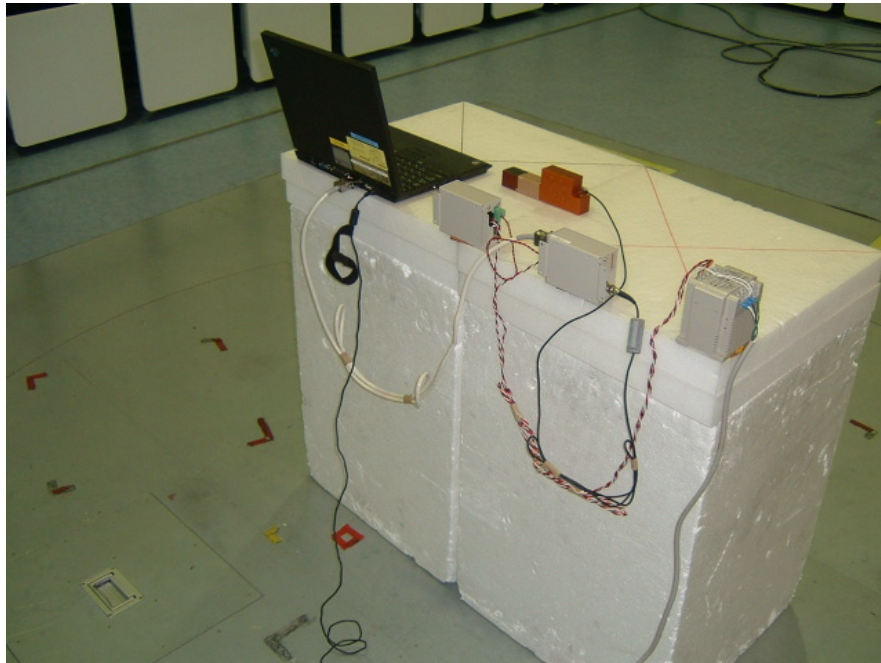
**Rear**



**Radiated emission**  
**Front**

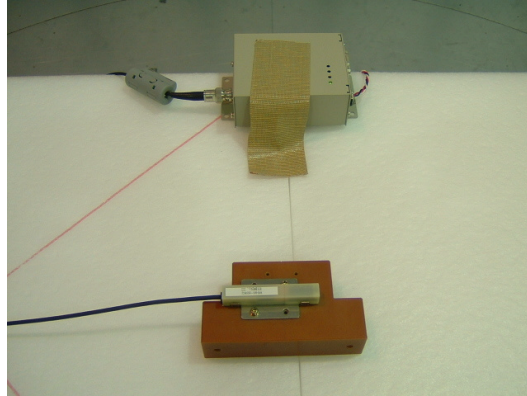


**Rear**

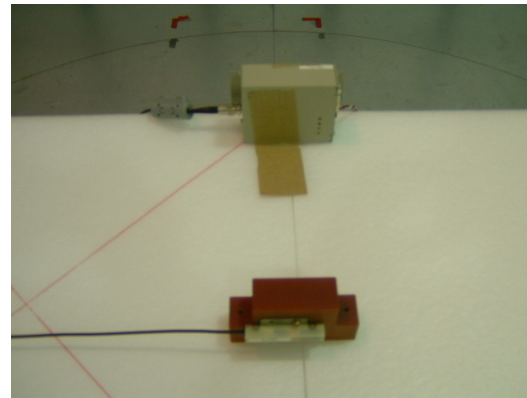


**Worst Case Position (Y-axis)**

**X-axis**



**Y-axis**



**\*The normal installation was X-axis and Y-axis of Two directions only.**

## **APPENDIX 2: Test instruments**

### **EMI test equipment**

<b>Control No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Test Item</b>	<b>Calibration Date * Interval(month)</b>
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE/CE	2004/04/12 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE/CE	2004/02/03 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	RE/CE	2004/02/18 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent/T SJ	-	RE	2003/12/19 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	RE/CE	2004/02/24 * 12
MAT-02	Attenuator(3dB )	Weinschel Corp	2	RE	2003/12/16 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2004/04/16 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2004/05/25 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2004/01/08 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE(EUT)	2004/02/17 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2004/02/17 * 12
MTA-01	Termination	TME	CT-01	CE	2004/02/16 * 12
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2003/12/27 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

#### **Test Item:**

**CE: Conducted emission,**  
**RE: Radiated emission,**

**APPENDIX 3: Data of EMI test**

**Conducted emission(FCC15C)**

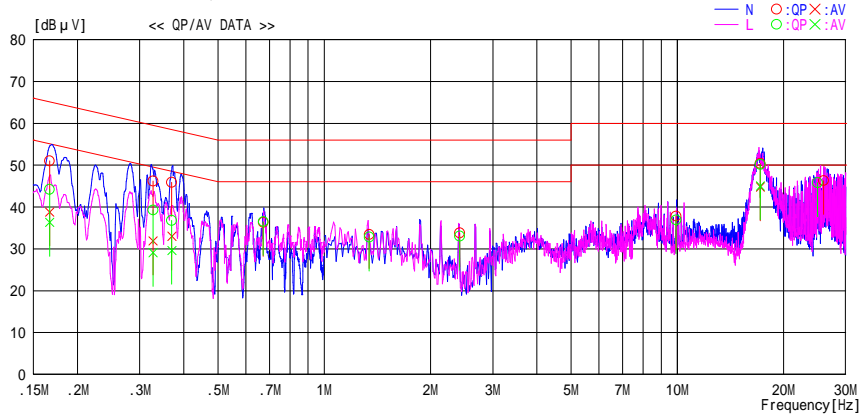
**DATA OF CONDUCTED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2004/08/18 17:13:31

Applicant : OMRON Corporation  
 Kind of EUT : Carrier ID Reader/Writer  
 Model No. : V640-HAM12 / V640-HS62  
 Serial No. : 2 / 22  
 Report No. : 24LE0207-HO  
 Power : AC120V/60Hz (EUT DC in 24.0V)  
 Temp /Humi% : 28 deg.C / 50 %  
 Operator : Makoto Kosaka

Mode / Remarks : Tx on(134.2kHz)

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)



NO	FREQ [MHz]	READING		C.F	RESULT		LIMIT		MARGIN		PHASE
		QP [dB μV]	AV [dB μV]		QP [dB μV]	AV [dB μV]	QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]	
1	0.1668	51.0	38.8	0.0	51.0	38.8	65.1	55.1	14.1	16.3	N
2	0.3277	46.2	31.9	0.0	46.2	31.9	59.5	49.5	13.3	17.6	N
3	0.3699	45.9	33.0	0.0	45.9	33.0	58.5	48.5	12.6	15.5	N
4	0.6725	36.2	---	0.1	36.3	---	56.0	---	19.7	---	N
5	1.3420	33.3	---	0.1	33.4	---	56.0	---	22.6	---	N
6	2.4175	33.3	---	0.5	33.8	---	56.0	---	22.2	---	N
7	9.9100	36.9	---	0.9	37.8	---	60.0	---	22.2	---	N
8	17.1900	49.1	43.5	1.3	50.4	44.8	60.0	50.0	9.6	5.2	N
9	25.9475	44.7	---	1.6	46.3	---	60.0	---	13.7	---	N
10	0.1668	44.2	36.3	0.0	44.2	36.3	65.1	55.1	20.9	18.8	L
11	0.3277	39.3	29.1	0.0	39.3	29.1	59.5	49.5	20.2	20.4	L
12	0.3699	36.8	29.6	0.0	36.8	29.6	58.5	48.5	21.7	18.9	L
13	0.6725	36.4	---	0.1	36.5	---	56.0	---	19.5	---	L
14	1.3420	32.7	---	0.1	32.8	---	56.0	---	23.2	---	L
15	2.4175	32.5	---	0.5	33.0	---	56.0	---	23.0	---	L
16	9.9100	36.0	---	0.9	36.9	---	60.0	---	23.1	---	L
17	17.1900	48.9	43.7	1.3	50.2	45.0	60.0	50.0	9.8	5.0	L
18	24.9475	44.2	---	1.6	45.8	---	60.0	---	14.2	---	L

CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.



## Conducted emission(FCC15C)

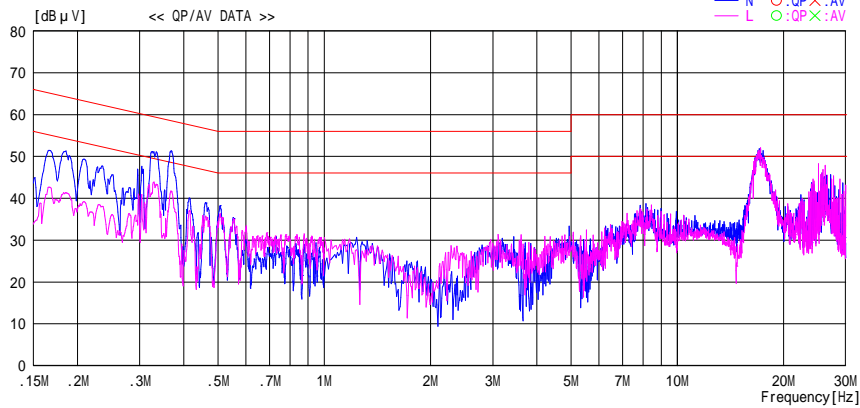
### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2004/08/18 17:20:33

Applicant : OMRON Corporation Kind of EUT : Carrier ID Reader/Writer Model No. : V640-HAM12 / V640-HS62 Serial No. : 2 / 22	Report No. : 24LE0207-HO Power : AC120V/60Hz (EUT DC in 24.0V) Temp /Humi% : 28 deg.C / 50 % Operator : Makoto Kosaka
--	--

Mode / Remarks : Stand-by

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)



NO	FREQ [MHz]	READING		C.F [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dB μV]	AV [dB μV]		QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]			

CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCURATION: RESULT=READING+C.F(LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

## Radiated emission(FCC15C)

UL Apex Co., LTD.  
Head office No.2 Anechoic chamber

Company : OMRON Corporation	Report No. : 24LE0207-HO
Equipment : Carrier ID Reader / Writer	Regulation : FCC 15.209(a)
Model : V640-HAM12 / V640-HS62	Test Distance : 3m
Serial : 2 / 22	Date : 2004/08/04
Power : DC24.0V	Engineer : Hiroka Umeyama
Mode : Transmitting (134.2kHz)	
Temperature : 26deg.C	
Humidity : 60%	

Frequency Range :9kHz-90kHz PK/AV DETECT(Test Receiver: BW 200Hz)  
Frequency Range :90kHz-110kHz QP DETECT(Test Receiver: BW 200Hz)  
Frequency Range :110kHz-150kHz PK/AV DETECT(Test Receiver: BW 200Hz)  
Frequency Range :150kHz-490kHz PK/AV DETECT(Test Receiver: BW 10kHz)  
Frequency Range :490kHz-30MHz QP DETECT(Test Receiver: BW 10kHz)

No.	FREQ [kHz]	Loop Max Angle [deg]	detector	T/R	ANT	ATTEN	CABLE	AMP	RESULT	LIMIT	MARGIN
			type	READING	Factor		LOSS	GAIN			
				[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]
1 (Y-Axis)	134.20	0	PK	101.7	19.9	6.0	0.3	26.6	101.3	105.0	3.7
1(Y-Axis)	134.20	0	AV	94.0	19.8	6.0	0.3	26.6	93.5	105.0	11.5
1 (Y-Axis)	134.20	45	PK	99.6	19.9	6.0	0.3	26.6	99.2	105.0	5.8
1 (Y-Axis)	134.20	90	PK	97.5	19.9	6.0	0.3	26.6	97.1	105.0	7.9
1(X-Axis)	134.20	0	PK	101.5	19.9	6.0	0.3	26.6	101.1	105.0	3.9
1(X-Axis)	134.20	45	PK	99.0	19.9	6.0	0.3	26.6	98.6	105.0	6.4
1(X-Axis)	134.20	90	PK	97.1	19.9	6.0	0.3	26.6	96.7	105.0	8.3
2(Y-Axis)	268.40	0	PK	62.6	19.9	6.0	0.1	27.1	61.5	99.0	37.5
2(Y-Axis)	268.40	0	AV	55.1	19.9	6.0	0.1	27.1	54.0	99.0	45.0
3(Y-Axis)	402.60	0	PK	63.6	19.8	6.0	0.1	27.4	62.1	95.5	33.4
3(Y-Axis)	402.60	0	AV	55.8	19.8	6.0	0.1	27.4	54.3	95.5	41.2
4(Y-Axis)	536.80	0	QP	47.7	19.8	6.0	0.2	27.6	46.1	73.0	26.9
5(Y-Axis)	671.00	0	QP	51.3	19.8	6.0	0.3	27.8	49.6	71.0	21.4
6(Y-Axis)	805.20	0	QP	37.8	19.8	6.0	0.2	27.9	35.9	69.4	33.5
7(Y-Axis)	939.40	0	QP	44.6	19.8	6.0	0.3	27.9	42.8	68.1	25.3
8(Y-Axis)	1073.60	0	QP	40.8	19.8	6.0	0.3	27.9	39.0	66.9	27.9
9(Y-Axis)	1206.00	0	QP	38.5	19.8	6.0	0.3	27.8	36.8	65.9	29.1
10(Y-Axis)	1340.00	0	QP	39.1	19.8	6.0	0.3	27.8	37.4	65.0	27.6

REMARKS

ANTENNA TYPE : Loop Antenna  
CALCULATION : READING + ANT Factor + ATTEN + Cable Loss - AMP Gain  
Limits 9kHz to 490kHz : 300m limits + 40log(300/3)  
490kHz to 30MHz : 30m limits + 40log(30/3)  
All other spurious emissions are more than 20dB below the limits.

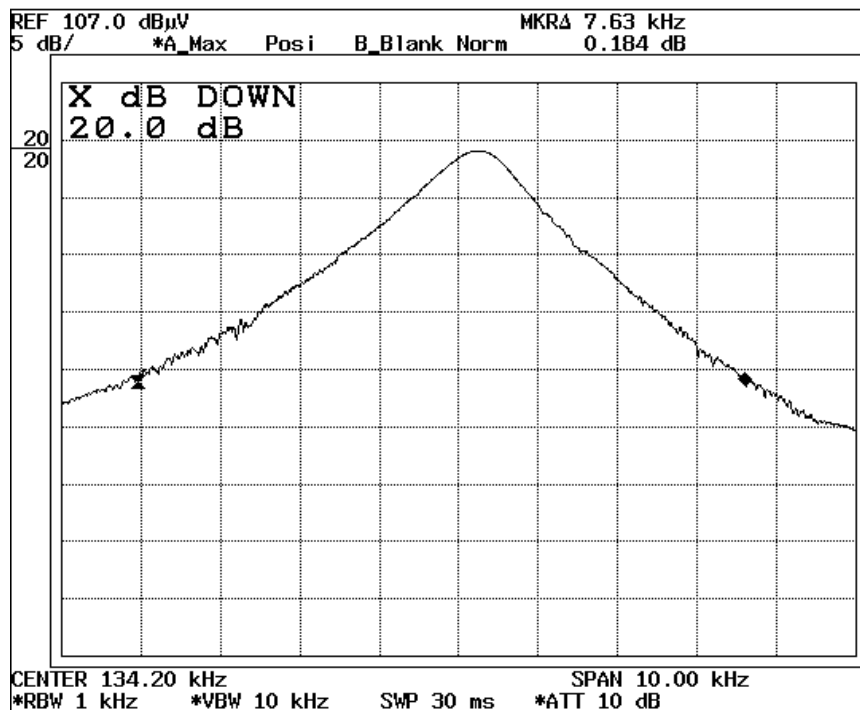
**-20dB Bandwidth(FCC15C)**

UL Apex Co., LTD.  
 Head office No.2 Anechoic chamber

Company : OMRON Corporation  
 Equipment : Carrier ID Reader / Writer  
 Model : V640-HAM12 / V640-HS62  
 Serial : 2 / 22  
 Power : DC24.0V  
 Mode : Transmitting (134.2kHz)  
 Temperature : 26deg.C  
 Humidity : 60%

Report No. : 24LE0207-HO  
 Regulation : N/A  
 Test Distance : 3m  
 Date : 2004/08/04  
 Engineer : Hiroka Umeyama

Freq.	Bandwidth	Limit
[kHz]	[kHz]	[kHz]
134.2	7.630	-





**Conducted emission(FCC15B)**

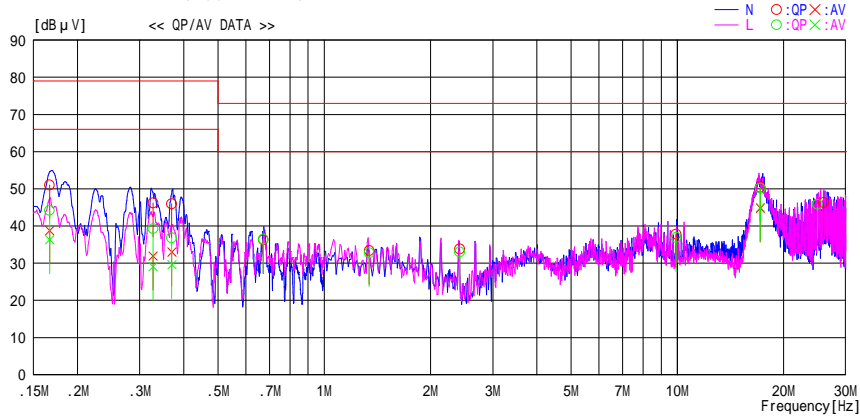
**DATA OF CONDUCTED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2004/08/18 17:13:31

Applicant : OMRON Corporation  
 Kind of EUT : Carrier ID Reader/Writer  
 Model No. : V640-HAM12 / V640-HS62  
 Serial No. : 2 / 22  
 Report No. : 24LE0207-HO  
 Power : AC120V/60Hz (EUT DC in 24.0V)  
 Temp /Humi% : 28 deg.C / 50 %  
 Operator : Makoto Kosaka

Mode / Remarks : Tx on(134.2kHz)

LIMIT : FCC15B ClassA(QP)(0.15-30MHz)  
 FCC15B ClassA(AV)(0.15-30MHz)



NO	FREQ [MHz]	READING		C.F [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dB μV]	AV [dB μV]		QP [dB μV]	AV [dB μV]	QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]	
1	0.1668	51.0	38.8	0.0	51.0	38.8	79.0	66.0	28.0	27.2	N
2	0.3277	46.2	31.9	0.0	46.2	31.9	79.0	66.0	32.8	34.1	N
3	0.3699	45.9	33.0	0.0	45.9	33.0	79.0	66.0	33.1	33.0	N
4	0.6725	36.2	---	0.1	36.3	---	73.0	---	36.7	---	N
5	1.3420	33.3	---	0.1	33.4	---	73.0	---	39.6	---	N
6	2.4175	33.3	---	0.5	33.8	---	73.0	---	39.2	---	N
7	9.9100	36.9	---	0.9	37.8	---	73.0	---	35.2	---	N
8	17.1900	49.1	43.5	1.3	50.4	44.8	73.0	60.0	22.6	15.2	N
9	25.9475	44.7	---	1.6	46.3	---	73.0	---	26.7	---	N
10	0.1668	44.2	36.3	0.0	44.2	36.3	79.0	66.0	34.8	29.7	L
11	0.3277	39.3	29.1	0.0	39.3	29.1	79.0	66.0	39.7	36.9	L
12	0.3699	36.8	29.6	0.0	36.8	29.6	79.0	66.0	42.2	36.4	L
13	0.6725	36.4	---	0.1	36.5	---	73.0	---	36.5	---	L
14	1.3420	32.7	---	0.1	32.8	---	73.0	---	40.2	---	L
15	2.4175	32.5	---	0.5	33.0	---	73.0	---	40.0	---	L
16	9.9100	36.0	---	0.9	36.9	---	73.0	---	36.1	---	L
17	17.1900	48.9	43.7	1.3	50.2	45.0	73.0	60.0	22.8	15.0	L
18	24.9475	44.2	---	1.6	45.8	---	73.0	---	27.2	---	L

CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F(LIN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

**Conducted emission(FCC15B)**

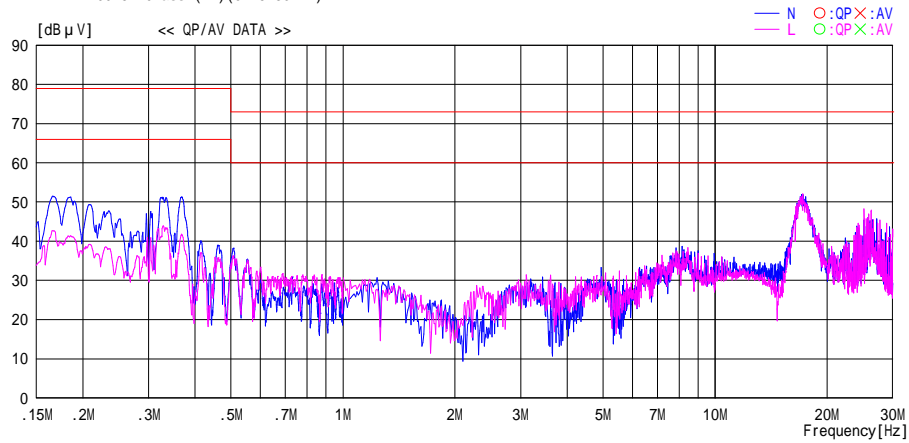
**DATA OF CONDUCTED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2004/08/18 17:20:33

Applicant	: OMRON Corporation	Report No.	: 24LE0207-HO
Kind of EUT	: Carrier ID Reader/Writer	Power	: AC120V/60Hz (EUT DC in 24.0V)
Model No.	: V640-HAM12 / V640-HS62	Temp /Humi%	: 28 deg.C / 50 %
Serial No.	: 2 / 22	Operator	: Makoto Kosaka

Mode / Remarks : Stand-by

LIMIT : FCC15B ClassA(QP)(0.15-30MHz)  
 FCC15B ClassA(AV)(0.15-30MHz)



NO	FREQ [MHz]	READING		C.F [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dB μ V]	AV [dB μ V]		QP [dB μ V]	AV [dB μ V]	QP [dB μ V]	AV [dB μ V]	QP [dB]	AV [dB]	

CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

**Radiated emission(FCC15B)**

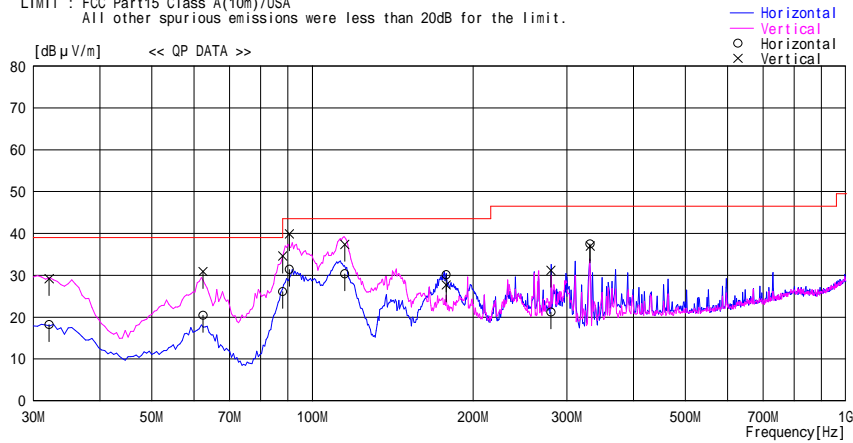
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2004/08/12 18:53:19

Applicant : OMRON Corporation  
 Kind of EUT : Carrier ID Reader / Writer  
 Model No. : V640-HAM12 / V640-HS62  
 Serial No. : 2 / 22  
 Report No. : 24LE0207-HO  
 Power : DC 24V  
 Temp /Humi% : 20deg.C / 67%  
 Operator : Makoto Kosaka

Mode / Remarks : Transmitting 134.2kHz

LIMIT : FCC Part15 Class A(10m)/USA  
 All other spurious emissions were less than 20dB for the limit.



No.	FREQ [MHz]	READING QP [dB μ V]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dB μ V/m]	LIMIT [dB μ V/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	32.111	24.0	17.7	4.2	27.7	18.2	39.0	20.8	400	0
2	62.389	35.8	7.8	4.6	27.8	20.4	39.0	18.6	290	0
3	88.000	41.3	7.5	5.0	27.7	26.1	39.0	12.9	0	0
4	90.585	46.2	7.9	5.0	27.7	31.4	43.5	12.1	400	314
5	115.000	40.2	12.4	5.4	27.7	30.3	43.5	13.2	400	0
6	178.176	35.6	16.0	6.1	27.6	30.1	43.5	13.4	400	0
7	280.119	22.0	19.3	7.1	27.2	21.2	46.5	25.3	400	0
8	331.778	42.2	15.5	7.3	27.5	37.5	46.5	9.0	200	192
----- Vertical -----										
9	32.111	35.0	17.7	4.2	27.7	29.2	39.0	9.8	100	97
10	62.389	46.3	7.8	4.6	27.8	30.9	39.0	8.1	100	92
11	88.000	49.8	7.5	5.0	27.7	34.6	39.0	4.4	166	258
12	90.585	54.7	7.9	5.0	27.7	39.9	43.5	3.6	138	281
13	115.000	47.3	12.4	5.4	27.7	37.4	43.5	6.1	100	87
14	178.176	33.2	16.0	6.1	27.6	27.7	43.5	15.8	100	159
15	280.119	32.0	19.3	7.1	27.2	31.2	46.5	15.3	100	116
16	331.778	41.7	15.5	7.3	27.5	37.0	46.5	9.5	100	162

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN  
 CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page: