

# **EMI TEST REPORT**


**Test Report No. : 23BE0062-YW-1**

**Applicant:** OMRON Corporation  
**Type of Equipment:** Radio Frequency Identification System  
**Model No.:** V640-HAM11, V640-HS61  
**Test standard:** FCC Part 15 Subpart C §15.207 and §15.209  
**FCC ID:** E4E6CYCID6400202  
**Test Result:** Complied

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International 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 contains 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 does not constitute an endorsement by NIST/NVLAP or U.S. Government.

**Date of test:** September 24 and October 7, 2002

**Tested by:**

  
\_\_\_\_\_  
Naoki Sakamoto  
Group Leader of EMC Section

**Approved by:**

  
\_\_\_\_\_  
Kazutoyo Nakanishi  
Site Operation Manager of EMC Section

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## **SECTION 1: Client information**

Company Name : OMRON Corporation  
Company Trade Name : OMRON  
Address : 20 Shimokaiinji, Nagaokakyo-shi, Kyoto 617-8510 JAPAN  
Telephone Number : +81 75 957 9849  
Facsimile Number : +81 75 951 5124  
Contact Person : Tomonori Ariyoshi

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

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

Type of Equipment : Radio Frequency Identification System  
Brand name : OMRON  
Model No. : V640-HAM11, V640-HS61  
Serial No. : 19 (V640-HAM11), - (V640-HS61)  
Rating : DC 24V, 0.1A  
Country of Manufacture : Japan  
Receipt Date of Sample : September 24, 2002  
Condition of E.U.T. : Production prototype

### **2.2 Product description**

Model: V640-HAM11(-x)\*, referred to, as the EUT in this report, is an amplifier unit of Radio Frequency Identification System.  
Model: V640-HS61(-x)\*, also referred to, as the EUT in this report, is CIDRW Head of Radio Frequency Identification System.

\* (-x) is for series models which the manufacturer will possibly release in the future. The series models don't contain electrical/mechanical modifications.

Frequency characteristics : 134.2 kHz  
Modulation : Amplitude Shift Keying  
Channel : 1  
Antenna Type : Loop Coil Antenna

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## **SECTION 3: Test specification, procedures and results**

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart C Intentional Radiators  
§15.203 Antenna requirement  
§15.207 Conducted limits  
§15.209 Radiated emission limits; general requirements

### **3.2 Procedures & results**

<b>Item</b>	<b>Test Procedure</b>	<b>Spec.</b>	<b>Deviation</b>	<b>Worst margin</b>	<b>Result</b>
Conducted emission	ANSI C63.4:2000	15.207 (a)	N/A	13.9 dB (27.0931MHz: L1)	Complied
Radiated emission	ANSI C63.4:2000	15.209 (a)	N/A	0.9 dB (45.49MHz: Vertical)	Complied
*1) Limits on CISPR 22 are applied.					

§15.203 Antenna requirement

The standard type of antenna connector is applied; however, the EUT complies this requirement since this radio equipment is for professional installation.

### **3.3 Additions or deviations to standards**

No addition, deviation or exclusion has been made from standards.

### **3.4 Confirmation**

**A-Pex International Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C.**

### **3.5 Uncertainty**

#### Conducted emission test

The measurement uncertainty (with a 95% confidence level) for this test was  $\pm 2.0$ dB.

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

#### Radiated Emission Test (3m)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.4$ dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 4.8$ dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

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### 3.6 Test Location

A-Pex International Co., Ltd. Yokowa Lab. No.3 Test site, Shielded room (No. 3 test site)  
108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN

Telephone number : +81 596 39 1485

Facsimile number : +81 596 39 0232

This site has been fully described in a report submitted to FCC office, and listed on September 12, 2000  
(Registration number: 90412). \*NVLAP Lab. code : 200109-0

A-Pex International Co., Ltd. Head office Semi-anechoic chamber  
4383-326 Asama-cho, Ise-shi, Mie-ken, 516-0021

Telephone number : +81 596 24 8116

Facsimile number : +81 596 24 8124

This site has been fully described in a report submitted to FCC office, and listed on February 2002  
(Registration number: 313583). \*NVLAP Lab. code : 100572-0

### 3.7 Test setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

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

**4.1 Operating Modes**

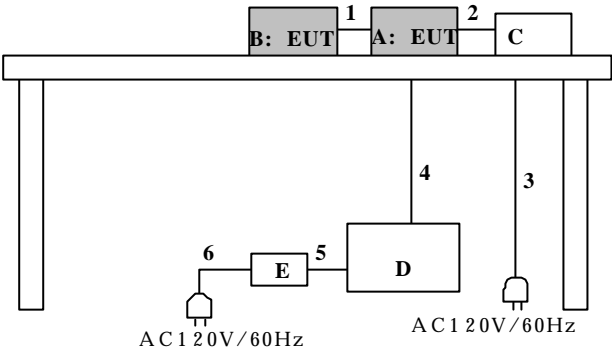
The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used:           Transmitting mode  
  Standby mode (Conducted emission only)

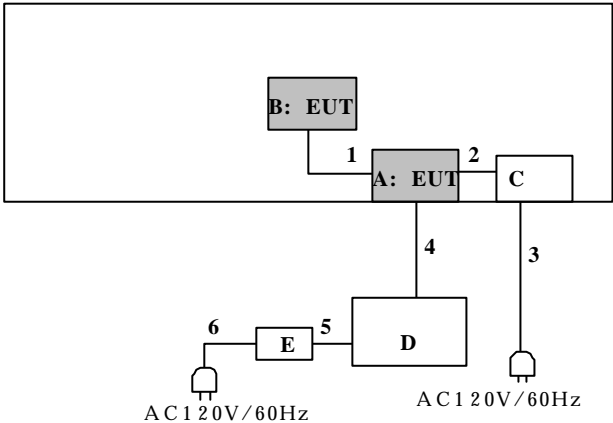
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

**4.2 Configuration and peripherals**

**Front View**



**Top View**



\*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	Remark
A	Amplifier Unit	V640-HAM11	19	OMRON	E4E6CYCID6100202	EUT
B	CIDRW Head	V640-HS61	-	OMRON	E4E6CYCID6100202	EUT
C	Power Supply	S82K-03024	-	OMRON	N/A	-
D	Personal Computer	PAS259NW	20020113J	TOSHIBA	DOC	-
E	AC Adaptor	PA2450U	3795534	TOSHIBA	N/A	-

**List of cables used**

No.	Name	Length (m)	Shield	Backshell Material	Remark
1	Antenna Cable	2.0	Y	Polyvinyl chloride	-
2	DC Power Cable	0.8	N	Polyvinyl chloride	-
3	AC Power Cable	2.3	N	Polyvinyl chloride	-
4	RS-232C Cable	2.0	Y	Polyvinyl chloride	-
5	DC Power Cable	1.8	N	Polyvinyl chloride	-
6	AC Power Cable	2.0	N	Polyvinyl chloride	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

The test was carried out in a shielded room 3.6 x 7.2 x 2.4m of Yokowa lab.

Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

EUT was placed on a 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. I/O cables and AC 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 to the input power source. All unused 50ohm connectors of the LISN 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 : 150kHz-30MHz  
EUT position : Table top  
EUT operation mode : Transmitting mode, Standby mode

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements have 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  
IF Bandwidth : 10kHz

### **5.5 Results**

Summary of the test results: Pass

Date: October 7, 2002

Test engineer: Naoki Sakamoto

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**SECTION 6: Radiated emission**

**6.1 Operating environment**

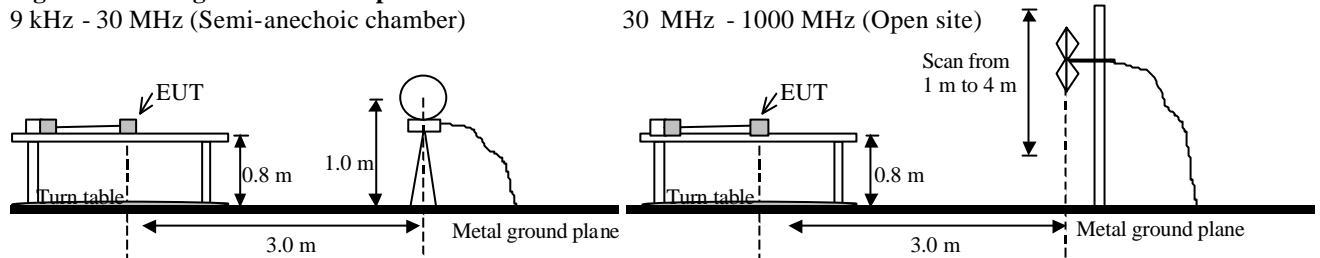
The test was carried out in a semi-anechoic chamber of Head office and an open site of Yokowa lab.

Temperature : See data  
Humidity : See data

**6.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.  
The rear of EUT and its peripherals was aligned and flushed with rear of tabletop. 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 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.  
A drawing of the set up is shown in the figure 1 and the photos of Appendix 1.

**Figure 1 Drawing of the test set-up**



**6.3 Test conditions**

Frequency range : 9kHz-1000MHz  
Test distance : 3m  
Antenna : Loop 9kHz-30MHz, Biconical 30MHz-300MHz, Logperiodic 300MHz-1GHz  
EUT position : Table top  
EUT operation mode : Transmitting mode

**6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured in a semi-anechoic chamber or an open test site with a ground plane at a distance of 3m. Pre check measurements were performed with a search coil at 80-90MHz, 270-290MHz and 500-700MHz which are high-level emission in a screened room to distinguish disturbances of EUT from the ambient noise, before tested at the open site. Measurements were performed with a quasi-peak detector or peak and average detectors. 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.

	9-90kHz	90-110kHz	110-150kHz	150-490kHz	490kHz-30MHz	30-1000MHz
Detector :	PK/ AV	QP	PK/ AV	PK/ AV	QP	QP
IF Bandwidth :	200Hz	200Hz	200Hz	10kHz	10kHz	120kHz

**6.5 Results**

Summary of the test results: Pass  
Date: September 24 and 30, 2002                      Test engineer: Naoki Sakamoto

## Contents of Appendixes

### **APPENDIX 1: Photographs of test setup**

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Page 12-13: Radiated emission

### **APPENDIX 2: Data of EMI test**

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Page 17 - 18: Radiated emission

Page 19: 20dB Band Width

### **APPENDIX 3: Test Instruments**

Page 20: Test Instruments

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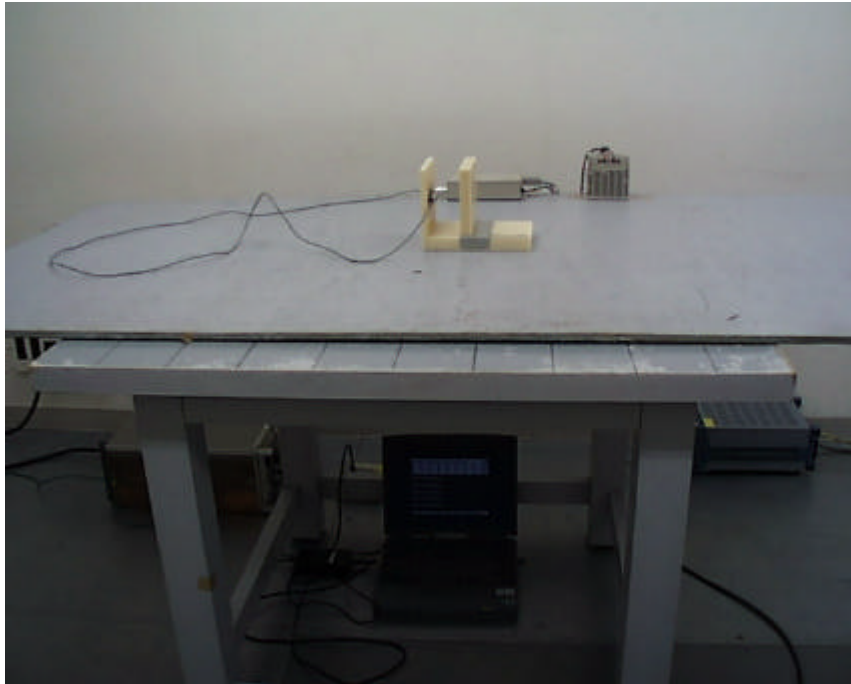
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Conducted emission  
Photograph 1



Photograph 2



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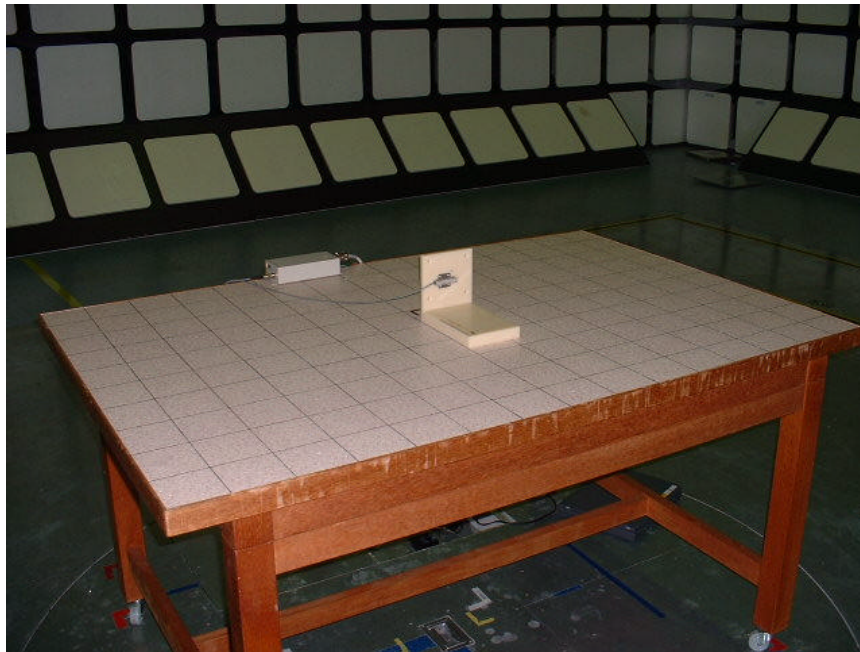
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**Radiated emission (9kHz - 30MHz)**  
**Photograph 1**



**Photograph 2**



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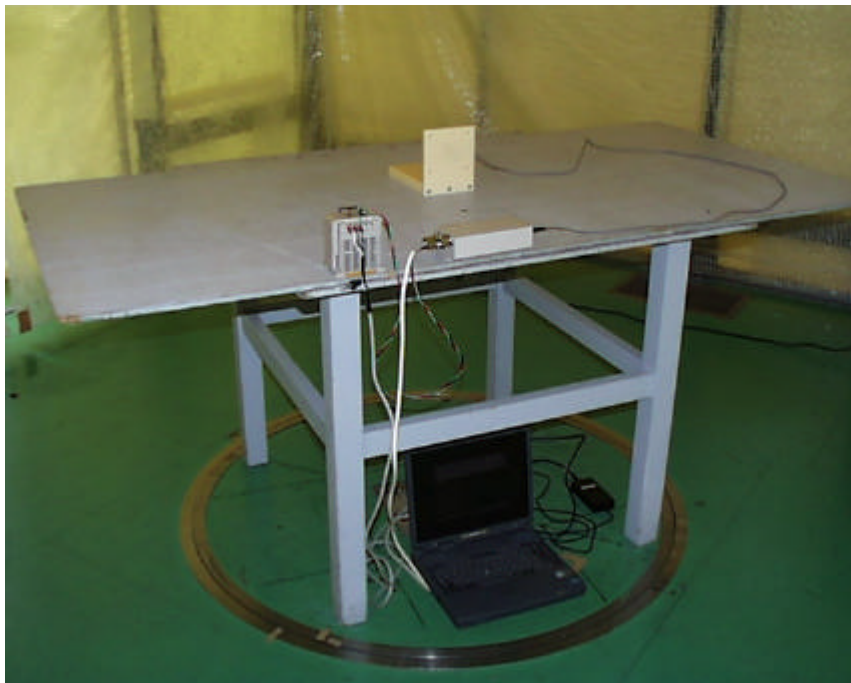
Facsimile: +81 596 39 0232

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**Radiated emission (30 - 1000MHz)**  
**Photograph 1**



**Photograph 2**



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