



## EMI TEST REPORT

**Test Report No. : 27JE0169-YK-A**

**Applicant : OMRON Corporation**

**Type of Equipment : Amplifier**

**Model No. : V680-HA63A**

**FCC ID : E4E6CYSIDV6800406**

**Test Standard : FCC Part15 Subpart C,  
Section 15.207, 15.209, 15.215, 15.225: 2006**

**Test Result : Complied**

1. This test report shall not be reproduced except in full, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation.
4. The test results in this test report are traceable to the national or international standards.

**Date of test:** June 4 - 7, 2007

**Tested by:** M. Hosaka  
Makoto Hosaka

**Approved by:** O. Watatani  
Osamu Watatani  
Manager of Yamakita EMC Lab.

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## 1 Applicant Information

Company Name : OMRON Corporation  
Address : 3-2 Narutani, Nakayama-cho, Ayabe-shi, Kyoto-fu, 623-0105 JAPAN  
Telephone Number : +81-773-42-6662  
Facsimile Number : +81-773-42-6135  
Contact Person : Shuichi Matsui

## 2 Product Description

Type of Equipment : Amplifier  
Model No. : V680-HA63A  
Serial No. : 5  
Rating : DC7.5V  
Country of Manufacture : Japan  
Receipt Date of Sample : May 22, 2007  
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.

Model: V680-HA63A (referred to as the EUT in this report) is an Amplifier.

Equipment type : Transceiver  
Frequency of operation : 13.56 MHz  
Type of modulation : ASK  
Antenna type : Loop coil antenna  
Antenna connector type : BNC  
Mode of operation : Simplex  
Other clock frequency : 12MHz (USB), 16MHz (CPU)  
Emission Designation : A1D  
Operation temperature range: -10 ~ +55 deg. C. (Amplifier)  
-25 ~ +70 deg. C. (Antenna: V680-HS65)

\*FCC Part15.31 (e)

The ID Controller provides the Amplifier with stable power supply and the equipment complies power supply regulation.

\*FCC Part15.203

The EUT has an external and particular antenna connector, but it is installed by the professionals.  
Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3 Test Specification, Procedures and 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 15.209: Radiated emission limits, general requirements  
 Section 15.215: Additional provisions to the general radiated emission limitations  
 Section 15.225: Operation within the band 13.110-14.010MHz

#### 3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	10.2dB (0.3811MHz, N, AV)	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.225 (a)	Radiated	N/A	52.1dB (Horizontal)	Complied
Electric Field Strength of Outside the Allocated bands	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.225 (b) (c)	Radiated	N/A	30.3dB (13.553MHz, Horizontal)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.209, Section 15.225 (d)	Radiated	N/A	6.7dB (34.69MHz, Vertical)	Complied
20dB Bandwidth	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.215(c)	Radiated	N/A	-	Complied
Frequency Tolerance	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.225 (e)	Radiated	N/A	-	Complied

\* Other than mentioned in 3.3, no addition, exclusion nor deviation has been made from the standard.

#### 3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.4.1	RSS-Gen 4.4.1	Conducted	-	Complied

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### 3.3 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2

	No.1 open site	No.2 open site	No.1 anechoic chamber
<b>Conducted emission</b>			
150kHz-30MHz	2.8 dB	2.8 dB	2.8 dB
<b>Radiated emission (3m)</b>			
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB
1GHz<	5.7 dB	5.7 dB	5.7 dB
<b>Radiated emission (10m)</b>			
30-300MHz	4.5 dB	4.4 dB	-
300-1000MHz	4.1 dB	4.1 dB	-

### Conducted Emission Test

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

### Radiated Emission Test

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

### Frequency tolerance

The measurement uncertainty (with 95% confidence level) for this test is 0.000014MHz.

### 3.4 Test Location

UL Japan, Inc. Yamakita EMC Lab.

907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN

Telephone number : +81 465 77 1011

Faxsimile number : +81 465 77 2112

NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005  
(Registration No.: 95486).

IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005  
(Registration No.: 466226).

IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).

IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5	Semi-anechoic chamber	
No.3 shielded room	4.0 x 5.0 x 2.7		

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

Refer to Appendix 1 to 3.

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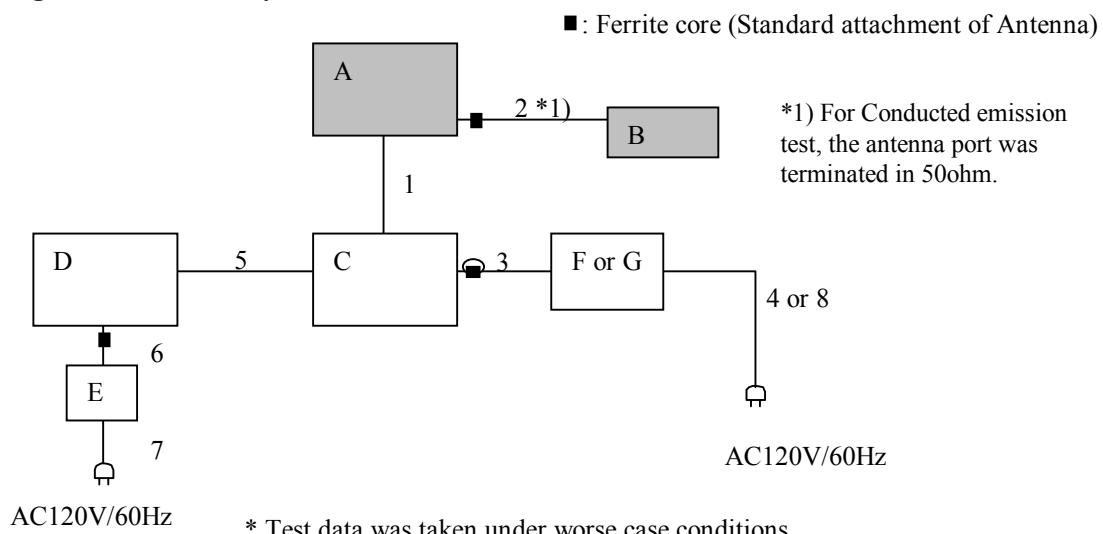
## 4 System Test Configuration

### 4.1 Justification

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

Operation: Transmitting (13.56MHz)

### 4.2 Configuration of Tested System



#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	Amplifier	V680-HA63A	5	Omron	E4E6CYSIDV6800406 (EUT)
B	Antenna	V680-HS65	35	Omron	(EUT)
C	ID Controller	V680-CA5D01	5	Omron	-
D	Personal Computer	2655-86J	97-630VG 07/01	IBM	-
E	AC Adaptor	02K6665	11S02K6665Z1 Z2U81409EF	IBM	-
F	Power Supply	S8VS-03024	07650M	Omron	for other test
G	DC Power Supply	PAN35-10A	DE001677	Kikusui	for Frequency tolerance test

#### List of cables used

No.	Name	Length (m)	Shield		Remark
			Connector	Cable	
1	Amplifier cable	5.0	Shielded	Shielded	-
2	Antenna cable	2.0	Shielded	Shielded	for V680-HS65
3	DC power cable	1.5	Unshielded	Unshielded	-
4	AC power cable	1.0	Unshielded	Unshielded	for S8VS-03024
5	RS232C cable	15.0	Shielded	Shielded	-
6	DC power cable	1.7	Unshielded	Unshielded	-
7	AC power cable	1.0	Unshielded	Unshielded	-
8	AC power cable	1.5	Unshielded	Unshielded	for PAN35-10A

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## 5 Conducted Emissions

### 5.1 Operating environment

The test was carried out in No.1 shielded room.

Temperature : See test data  
Humidity : See test data

### 5.2 Test configuration

EUT was placed on a wooden platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. EUT was located 80cm from LISN and excess AC cable was bundled in center. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. A drawing of the set up is shown in the photos of Appendix 1.

### 5.3 Test conditions

Frequency range : 0.15 - 30MHz  
EUT position : Table top  
EUT operation mode : Transmitting

### 5.4 Test procedure

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV  
IF Bandwidth: 9kHz

### 5.5 Results

Summary of the test results : Pass

Date : June 6, 2007 Test engineer : Makoto hosaka

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## 6 Radiated Emissions (Fundamental, Spurious and Outside the Allocated bands)

### 6.1 Operating environment

The test was carried out in No.1 anechoic chamber.

Temperature : See test data  
Humidity : See test data

### 6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

### 6.3 Test conditions

Frequency range : 9kHz - 1GHz  
EUT position : Table top  
EUT operation mode : Transmitting

### 6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured 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 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
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

The EUT and its antennas were previously checked at each position of three or two axes. The position in which the maximum noise occurred was chosen to put into measurement. See the table and photographs in page 16 to 18. 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])

### 6.5 Results

Summary of the test results : Pass

Date : June 4 and 5, 2007

Test engineer : Makoto Hosaka

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## 7 20dB Bandwidth & Occupied Bandwidth (99%)

### Test Procedure

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

Summary of the test results: Pass

Date : June 5, 2007

Test engineer : Makoto Hosaka

## 8 Frequency Tolerance

### Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.  
The temperature test was started after the temperature stabilization time of 30 minutes.

Summary of the test results: Pass

Date : June 7, 2007

Test engineer : Makoto Hosaka

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

Page 11 : Conducted emission  
Page 12 : Radiated emission  
Page 13 - 14 : Pre-check of the worst position

### **APPENDIX 2: Test Data**

Page 15 - 17 : Conducted Emission  
Page 18 - 20 : Radiated Emission  
18 : Fundamental and Outside the Allocated bands  
19-20 : Spurious emission  
Page 21 : Bandwidth  
Page 22 - 24 : Frequency Tolerance

### **APPENDIX 3: Test instruments**

Page 25 : Test instruments

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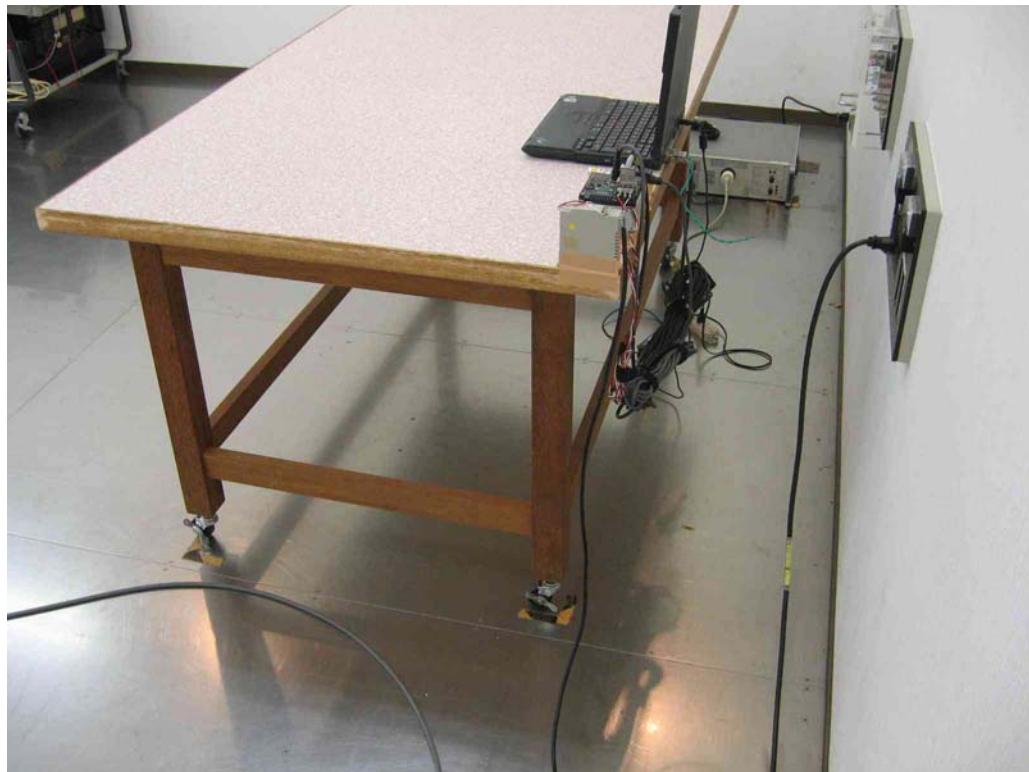
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**Conducted emission**



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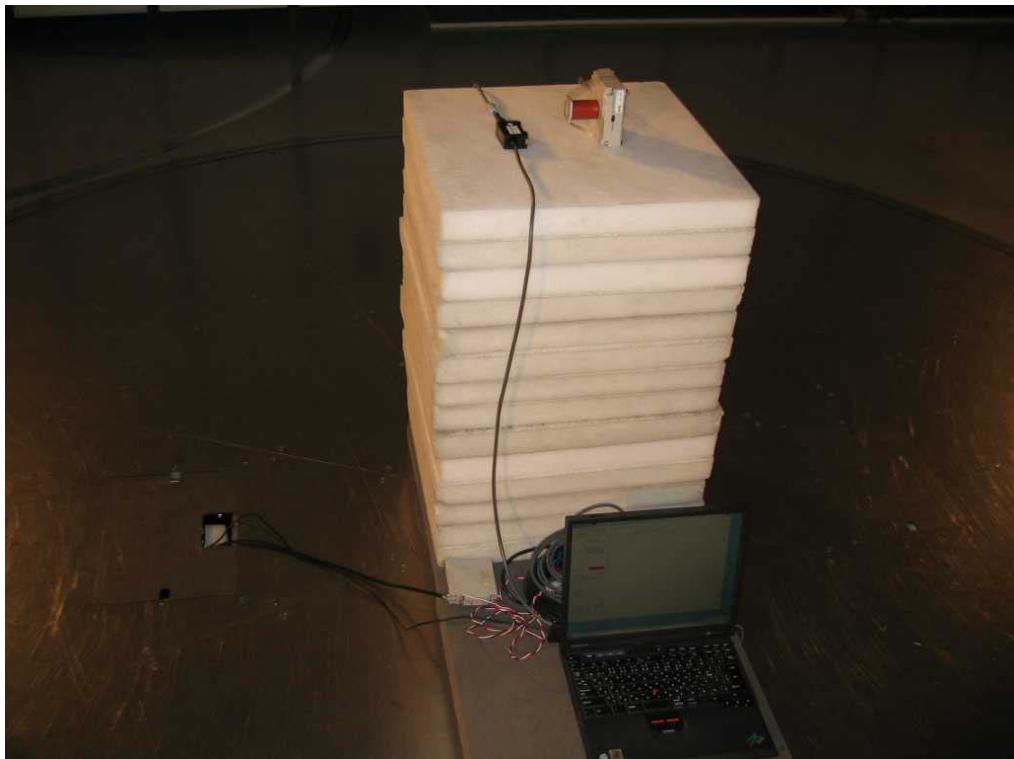
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### Radiated emission



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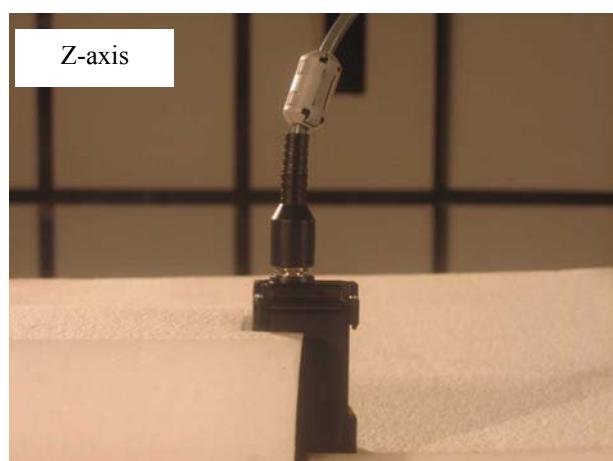
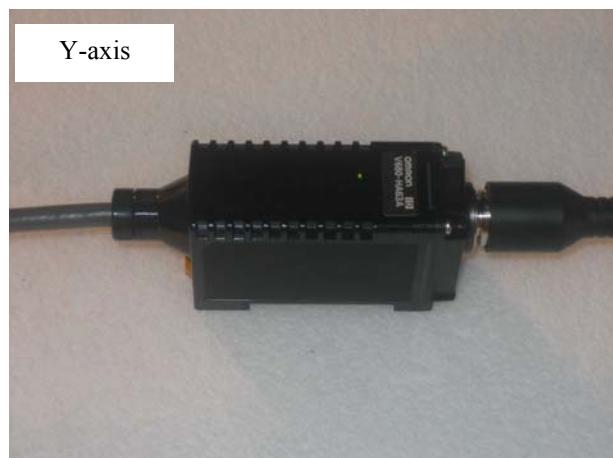
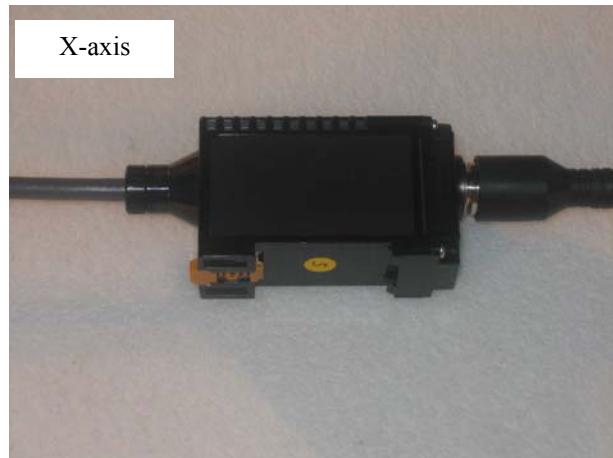
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**Pre-check of the worst position (Amplifier)**



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**Pre-check of the worst position (Antenna)**



**Worst-case combination**

Amplifier		Antenna	
Horizontal	Vertical	Horizontal	Vertical
X	X	Y	Y

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# DATA OF CONDUCTION TEST

UL Japan, Inc.  
YAMAKITA No.1 SHIELD ROOM  
Report No. : 27JE0169-YK-A

Applicant : OMRON Corporation  
 Kind of Equipment : Amplifier  
 Model No. : V680-HA63A  
 Serial No. : No. 5  
 Power : AC120V/60Hz (DC7.5V)  
 Mode : Transmitting Mode (13.56MHz)  
 Remarks : Antenna port: 50Ω terminated  
 Date : 6/6/2007  
 Phase : Single Phase  
 Temperature : 24 °C      Engineer : Makoto Hosaka  
 Humidity : 51 %  
 Regulation : FCC Part15C § 15.207. (CISPR Pub. 22)

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μV]	AV [dB μV]	QP [dB μV]	AV [dB μV]				QP [dB]	AV [dB μV]	QP [dB μV]	AV [dB μV]	QP [dB]	AV [dB]
1.	0.1500	42.9	28.8	49.2	35.2	0.1	0.1	0.0	49.4	35.4	66.0	56.0	16.6	20.6
2.	0.1916	43.7	28.4	50.0	35.2	0.1	0.1	0.0	50.2	35.4	64.0	54.0	13.8	18.6
3.	0.3562	46.4	37.3	47.4	37.0	0.1	0.2	0.0	47.7	37.6	58.8	48.8	11.1	11.2
4.	0.3811	47.0	37.8	46.9	37.0	0.1	0.2	0.0	47.3	38.1	58.3	48.3	11.0	10.2
5.	7.5403	37.6	—	38.5	—	0.3	0.8	0.0	39.6	—	60.0	50.0	20.4	—
6.	13.5601	38.9	34.3	38.3	33.8	0.6	1.3	0.0	40.8	36.2	60.0	50.0	19.2	13.8
7.	22.2543	34.2	—	34.3	—	0.8	1.8	0.0	36.9	—	60.0	50.0	23.1	—

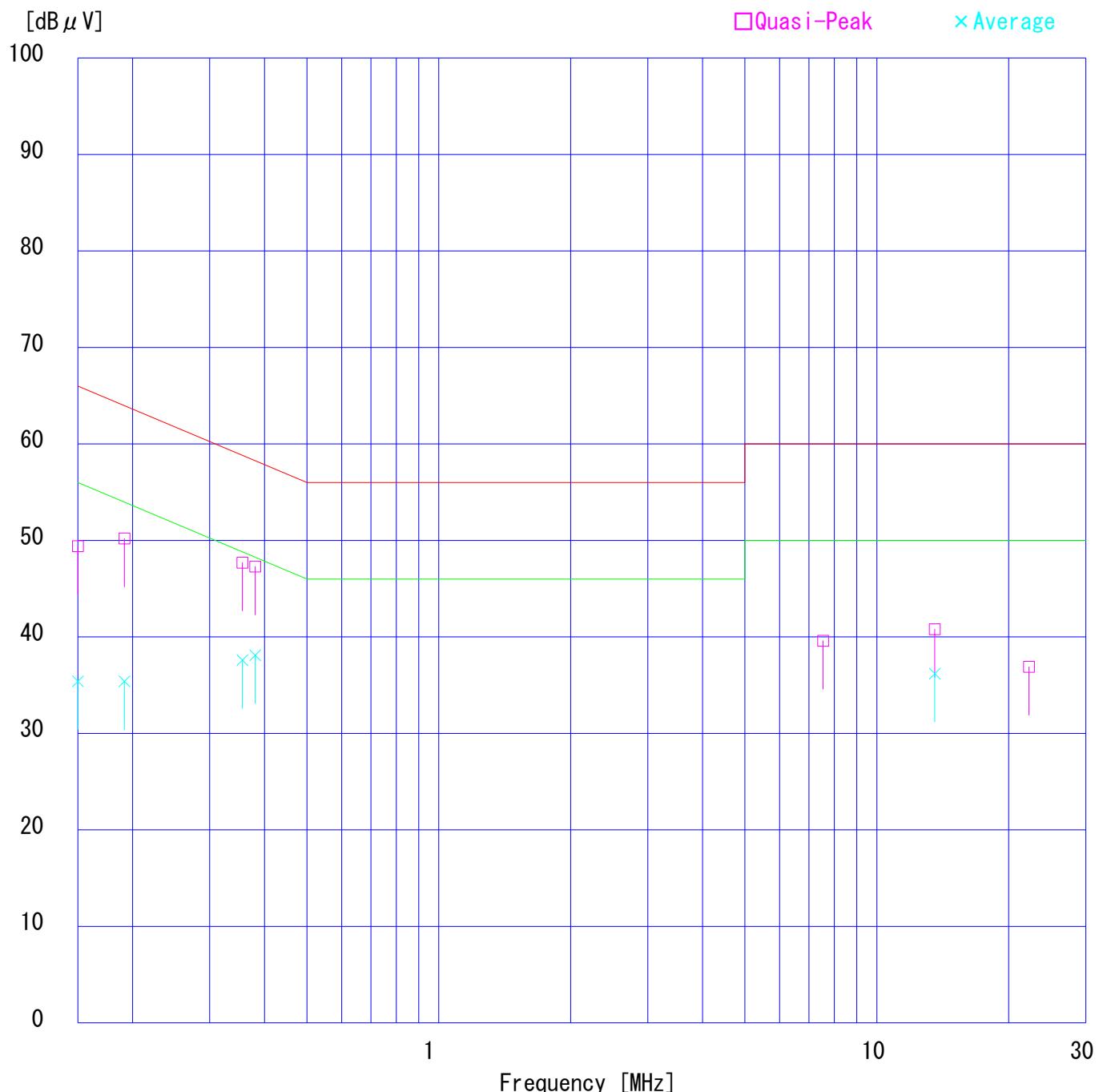
CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■ LISN: KLS-01 (NSLK8126) ■ COAXIAL CABLE: KCC-14/15/16/18  
 ■ PULSE LIMITTER: KPL-01 (PL01) ■ EMI RECEIVER: KTR-02 (ESCS30)

# DATA OF CONDUCTION TEST

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YAMAKITA No.1 SHIELD ROOM  
Report No. : 27JE0169-YK-A

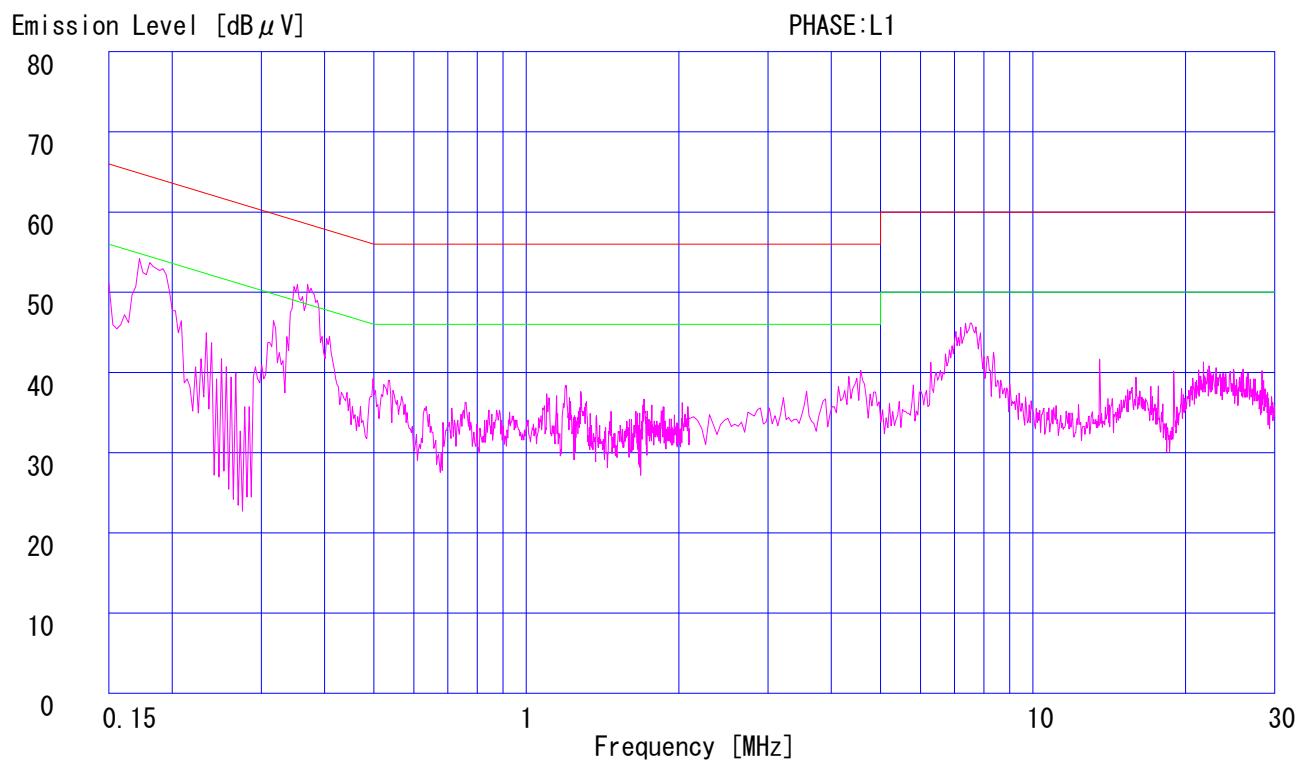
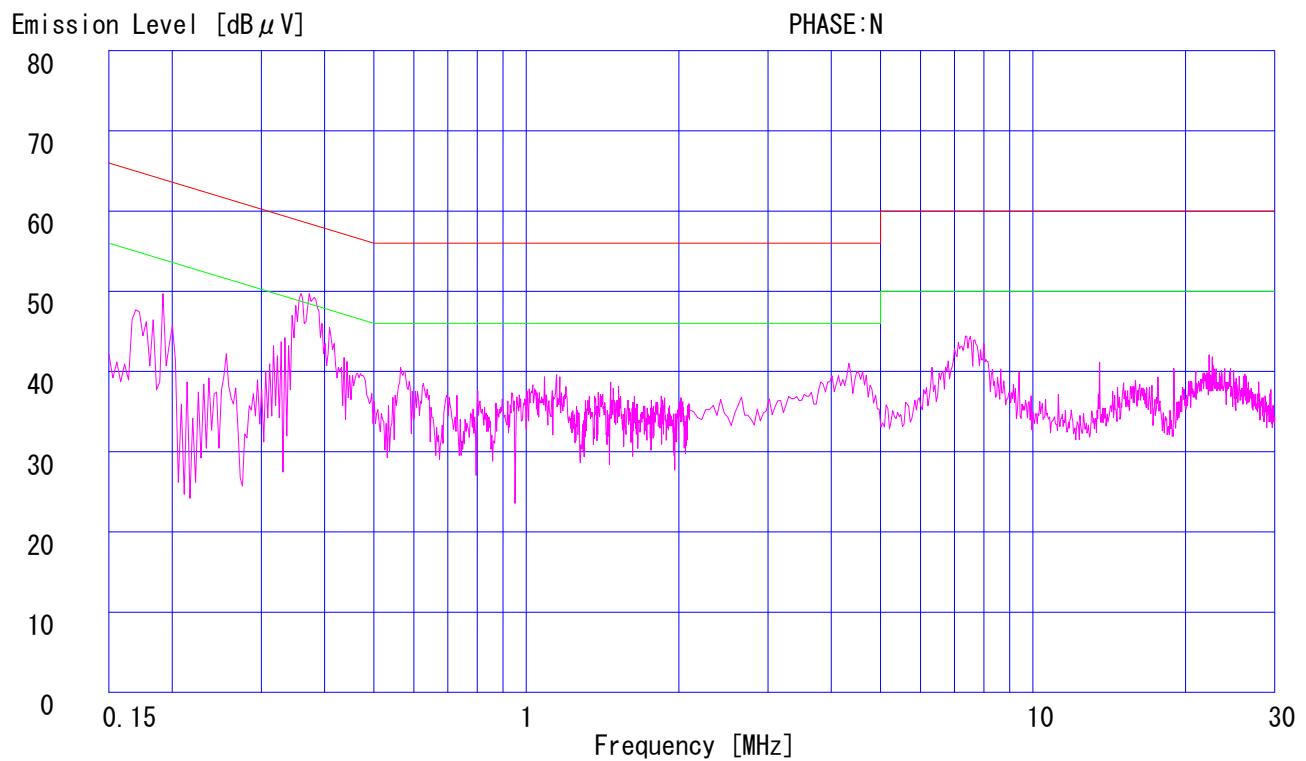
Applicant : OMRON Corporation  
Kind of Equipment : Amplifier  
Model No. : V680-HA63A  
Serial No. : No. 5  
Power : AC120V/60Hz (DC7.5V)  
Mode : Transmitting Mode (13.56MHz)  
Remarks : Antenna port: 50Ω terminate  
Date : 6/6/2007  
Phase : Single Phase  
Temperature : 24 °C      Engineer : Makoto Hosaka  
Humidity : 51 %  
Regulation : FCC Part15C § 15.207. (CISPR Pub. 22 )



# DATA OF CONDUCTION TEST CHART

UL Japan, Inc.  
YAMAKITA No.1 SHIELD ROOM  
Report No. : 27JE0169-YK-A

Applicant : OMRON Corporation  
Kind of Equipment : Amplifier  
Model No. : V680-HA63A  
Serial No. : No. 5  
Power : AC120V/60Hz (DC7.5V)  
Mode : Transmitting Mode (13.56MHz)  
Remarks : Antenna port: 50Ω terminate  
Date : 6/6/2007  
Phase : Single Phase  
Temperature : 24 °C  
Humidity : 51 %  
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22 )  
Regulation 2 : None



# Data of Field Strength and Outside Filed Strength: FCC15.225

UL Japan, Inc.  
YAMAKITA No1 Anechoic Chamber

Company	: OMRON Corporation	Report No.	: 27JE0169-YK-A
Equipment	: Amplifier	Regulation	: FCC Part15 SupartC 15.225
Model	: V680-HA63A	Test Distance	: 3m
Sample No.	: No.5	Date	: 2007/06/05
FCC ID	: E4E6CYSIDV6800406	Temperature	: 24deg.C
Power	: DC7.5V	Humidity	: 45%
Mode	: Transmitting (13.56MHz)		
Remarks	: AMP cable 5m, ANT cable 2m		

ENGINEER : Makoto Hosaka

## Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	74.3	72.4	19.5	5.8	0.7	28.4	71.9	70.0	124.0	52.1	54.0

Field strength of 13.553MHz to 13.567MHz Limit(3m) =  $84\text{dBuV/m} + 40\log 30\text{m}/3\text{m}$   
= 124dBuV/m (FCC15.225(a))

## Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	28.0	27.4	19.5	5.8	0.7	28.4	25.6	25.0	69.5	43.9	44.5
2	13.410	33.0	31.1	19.5	5.8	0.7	28.4	30.6	28.7	80.5	49.9	51.8
3	13.553	62.6	60.6	19.5	5.8	0.7	28.4	60.2	58.2	90.5	30.3	32.3
4	13.567	61.2	59.2	19.5	5.8	0.7	28.4	58.8	56.8	90.5	31.7	33.7
5	13.710	32.8	30.9	19.6	5.8	0.7	28.4	30.5	28.6	80.5	50.0	51.9
6	14.010	28.2	27.5	19.6	5.8	0.7	28.5	25.8	25.1	69.5	43.7	44.4

Outside filed strength frequencies

- filed strength band  $F_c \pm 7\text{kHz}$ : 13.553MHz to 13.567MHz
- Outside filde strength  $F_c \pm 150\text{kHz}$ : 13.410MHz to 13.710MHz
- Outside filde strength  $F_c \pm 450\text{kHz}$ : 13.110MHz to 14.010MHz

$F_c = 13.56\text{MHz}$

Limits (3m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz :  $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$  (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz :  $40.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 80.5\text{dBuV/m}$  (FCC15.225(c))
- Below 13.110MHz and Above 14.010MHz :  $29.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 69.5\text{dBuV/m}$  (FCC15.225(d) and FCC15.209)

Antenna: KLP-01(HFH2-Z2) 0.009-30MHz

KCC-30/31/32/34(RE)

AMP: KAF-05(8447D)

Receiver: KTR-01

# DATA OF RADIATION TEST

UL Japan, Inc.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 27JE0169-YK-A

Applicant : OMRON Corporation  
Kind of Equipment : Amplifier  
Model No. : V680-HA63A  
Serial No. : No. 5  
Power : DC7.5V  
Mode : Transmitting Mode (13.56MHz)  
Remarks : AMP cable:5m, ANT cable:2m  
Date : 6/5/2007  
Test Distance : 3 m  
Temperature : 24 °C  
Humidity : 45 %  
Regulation : FCC Part15C § 15.209 9KHz-30MHz (3m)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]	HOR [dB]	VER [dB]	HOR [dB]	VER [dB]
1.	27.12	BB	27.5	33.3	21.2	28.5	1.0	5.8	27.0	32.8	69.5	42.5	36.7	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ANTENNA:KLP-01 (HFH2-Z2) 0.009-30MHz

■CABLE:KCC-30/31/32/34 ■PREAMP:KAF-05 (8447D) ■EMI RECEIVER:KTR-01 (ES140)

# DATA OF RADIATION TEST

UL Japan, Inc.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 27JE0169-YK-A

Applicant : OMRON Corporation  
 Kind of Equipment : Amplifier  
 Model No. : V680-HA63A  
 Serial No. : No. 5  
 Power : DC7.5V  
 Mode : Transmitting Mode (13.56MHz)  
 Remarks : AMP cable:5m, ANT cable:2m  
 Date : 6/4/2007  
 Test Distance : 3 m  
 Temperature : 25 °C      Engineer : Makoto Hosaka  
 Humidity : 51 %  
 Regulation : FCC Part15C § 15.209

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]	HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]	HOR [dB]	VER [dB]
1.	34.69	BB	27.7	38.1	17.1	28.8	1.1	5.8	22.9	33.3	40.0	17.1	6.7	
2.	40.68	BB	28.0	40.1	13.7	28.8	1.2	5.8	19.9	32.0	40.0	20.1	8.0	
3.	44.51	BB	31.4	42.2	12.6	28.8	1.3	5.8	22.3	33.1	40.0	17.7	6.9	
4.	54.24	BB	27.3	39.5	9.6	28.6	1.4	5.8	15.5	27.7	40.0	24.5	12.3	
5.	67.80	BB	38.1	35.5	7.0	28.5	1.6	5.8	24.0	21.4	40.0	16.0	18.6	
6.	81.36	BB	35.0	40.2	6.9	28.6	1.8	5.8	20.9	26.1	40.0	19.1	13.9	
7.	94.92	BB	34.1	37.9	9.5	28.6	2.0	5.8	22.8	26.6	43.5	20.7	16.9	
8.	108.48	BB	23.8	32.5	11.7	28.4	2.1	5.8	15.0	23.7	43.5	28.5	19.8	
9.	122.05	BB	34.6	40.8	13.4	28.4	2.3	5.8	27.7	33.9	43.5	15.8	9.6	
10.	135.60	BB	34.9	36.8	14.2	28.4	2.4	5.8	28.9	30.8	43.5	14.6	12.7	
11.	216.96	BB	38.3	33.9	17.1	27.8	3.1	5.8	36.5	32.1	46.0	9.5	13.9	
12.	325.72	BB	30.2	40.8	15.0	27.6	4.0	5.9	27.5	38.1	46.0	18.5	7.9	
13.	401.04	BB	39.8	39.6	17.1	28.4	4.7	5.9	39.1	38.9	46.0	6.9	7.1	
14.	781.71	BB	33.9	30.7	21.0	28.9	6.3	5.9	38.2	35.0	46.0	7.8	11.0	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

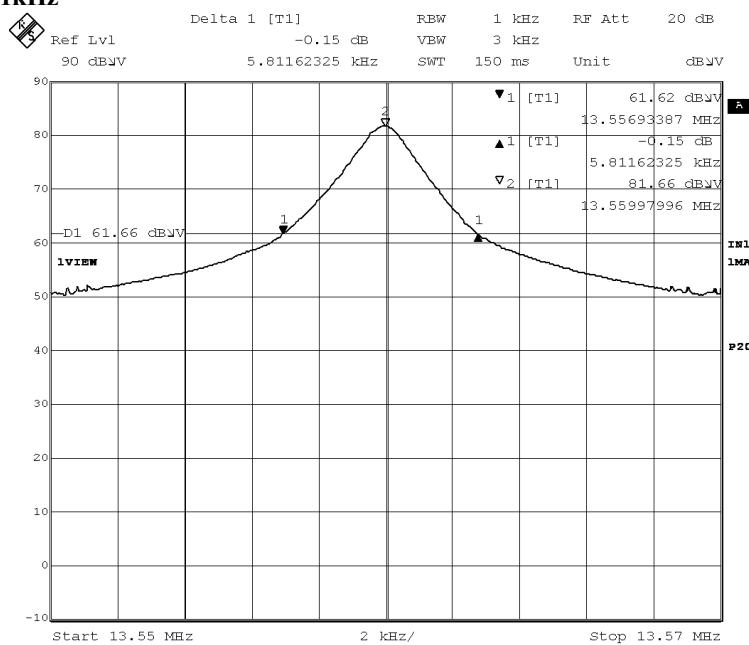
■ ANTENNA: KBA-03 (BBA9106) 30-299.99MHz / KLA-03 (USLP9143) 300-1000MHz  
 ■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-02 (ESCS30)

### 20dB Bandwidth: FCC 15.215(c)

**COMPANY** : OMRON Corporation  
**Equipment** : Amplifier  
**MODEL NUMBER**: V680-HA63A  
**SERIAL NUMBER**: No.5  
**FCC ID** : E4E6CYSIDV6800406  
**POWER** : DC7.5V

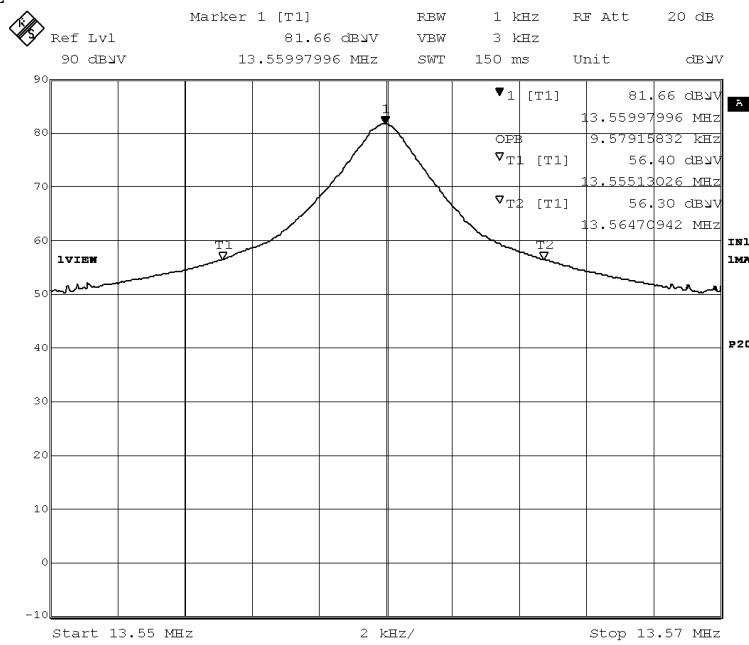
**UL Japan, Inc. Yamakita No.1 Anechoic chamber**  
**REPORT No.** : 27JE0169-YK-A  
**REGULATION** : FCC Part15SubpartC 215(c)  
**DATE** : 2007/06/05  
**TEMP./HUMI** : 24°C/45%  
**TEST MODE** : Transmitting  
**ENGINEER** : Makoto Hosaka

### 20dB Bandwidth: 5.81kHz



Date: 5.JUN.2007 22:20:11

### OBW(99%): 9.58kHz



Date: 5.JUN.2007 22:20:57

# Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.  
YAMAKITA No.4 Shield room

Company	: OMRON Corporation	Report No.	: 27JE0169-YK-A
Equipment	: Amplifier	Regulation	: FCC Part15 SupartC 15.225 (e)
Model	: V680-HA63A		
Sample No.	: No.5	Date	: 2007/06/07
FCC ID	: E4E6CYSIDV6800406	Temperature	: 23deg.C
Power	: AC120V/60Hz	Humidity	: 62%
Mode	: Transmitting (13.56MHz)		

ENGINEER : Makoto Hosaka

**Input Voltage:DC20.4V (85%)**

**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55987	-0.00013	-0.00096	0.01
after 2minutes	13.56	13.55987	-0.00013	-0.00096	0.01
after 5minutes	13.56	13.55986	-0.00014	-0.00103	0.01
after 10minutes	13.56	13.55987	-0.00013	-0.00096	0.01

**Input Voltage:DC27.6V(115%)**

**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55990	-0.00010	-0.00074	0.01
after 2minutes	13.56	13.55989	-0.00011	-0.00081	0.01
after 5minutes	13.56	13.55988	-0.00012	-0.00088	0.01
after 10minutes	13.56	13.56987	0.00987	0.07279	0.01

## Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.  
YAMAKITA No.4 Shield room

Company : OMRON Corporation  
Equipment : Amplifier  
Model : V680-HA63A  
Sample No. : No.5  
FCC ID : E4E6CYSIDV6800406  
Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)

Report No. : 27JE0169-YK-A  
Regulation : FCC Part15 SupartC 15.225 (e)  
Date : 2007/06/07  
Temperature : 23deg.C  
Humidity : 62%

ENGINEER : Makoto Hosaka

### Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55993	-0.00007	-0.00052	0.01
after 2minutes	13.56	13.55994	-0.00006	-0.00044	0.01
after 5minutes	13.56	13.55994	-0.00006	-0.00044	0.01
after 10minutes	13.56	13.55994	-0.00006	-0.00044	0.01

### Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55993	-0.00007	-0.00052	0.01
after 2minutes	13.56	13.55995	-0.00005	-0.00037	0.01
after 5minutes	13.56	13.55994	-0.00006	-0.00044	0.01
after 10minutes	13.56	13.55993	-0.00007	-0.00052	0.01

### Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55994	-0.00006	-0.00044	0.01
after 2minutes	13.56	13.55994	-0.00006	-0.00044	0.01
after 5minutes	13.56	13.55992	-0.00008	-0.00059	0.01
after 10minutes	13.56	13.55993	-0.00007	-0.00052	0.01

# Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.  
YAMAKITA No.4 Shield room

Company : OMRON Corporation  
Equipment : Amplifier  
Model : V680-HA63A  
Sample No. : No.5  
FCC ID : E4E6CYSIDV6800406  
Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)

Report No. : 27JE0169-YK-A  
Regulation : FCC Part15 SupartC 15.225 (e)  
Date : 2007/06/07  
Temperature : 23deg.C  
Humidity : 62%

ENGINEER : Makoto Hosaka

## Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55993	-0.00007	-0.00052	0.01
after 2minutes	13.56	13.55992	-0.00008	-0.00059	0.01
after 5minutes	13.56	13.55991	-0.00009	-0.00066	0.01
after 10minutes	13.56	13.55990	-0.00010	-0.00074	0.01

## Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55992	-0.00008	-0.00059	0.01
after 2minutes	13.56	13.55990	-0.00010	-0.00074	0.01
after 5minutes	13.56	13.55989	-0.00011	-0.00081	0.01
after 10minutes	13.56	13.55988	-0.00012	-0.00088	0.01

## Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55989	-0.00011	-0.00081	0.01
after 2minutes	13.56	13.55988	-0.00012	-0.00088	0.01
after 5minutes	13.56	13.55987	-0.00013	-0.00096	0.01
after 10minutes	13.56	13.55986	-0.00014	-0.00103	0.01

## Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55987	-0.00013	-0.00096	0.01
after 2minutes	13.56	13.55987	-0.00013	-0.00096	0.01
after 5minutes	13.56	13.55988	-0.00012	-0.00088	0.01
after 10minutes	13.56	13.55987	-0.00013	-0.00096	0.01

## Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.55988	-0.00012	-0.00088	0.01
after 2minutes	13.56	13.55987	-0.00013	-0.00096	0.01
after 5minutes	13.56	13.55988	-0.00012	-0.00088	0.01
after 10minutes	13.56	13.55989	-0.00011	-0.00081	0.01

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**APPENDIX 3**  
**Test Instruments**
**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
YA-CE	Conducted emission(software)	UL Japan	CE(Ver.1.6)	CE	-
KCC-14/15/16 /18/KPL-01/K RM-01	Coaxial Cable/Pulse Limitter/RF Relay Matrix	Fujikura/Suhner/PMM/ TSJ	5D-2W/8D-2W/S04272 B/S04272B/PL01/-	CE	2007/05/15 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE(EUT)	2007/04/05 * 12
KLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2006/09/25 * 12
KTM-01	Terminator	TME	CT-01BP	CE	2007/03/13 * 12
KTM-03	Terminator	TME	CT-01BP	CE	2007/03/13 * 12
KOS-04	Humidity Indicator	SATO	PC-5000TRH	CE	2006/07/14 * 24
KSA-01	Spectrum Analyzer	Advantest	R3365	CE/RE	2006/07/01 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	CE/RE	2006/11/25 * 12
KJM-03	Measure	TAJIMA	GL19-55	CE	-
YA-RE	Radiated emission(software)	UL Japan	RE(Ver.1.5)	RE	-
KAEC-01	Anechoic Chamber	JSE	Semi 3m	RE/BW	2006/08/31 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE/BW	2007/04/13 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE/BW	2007/03/28 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/01/06 * 12
KCC-30/31/32 /34/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/S04272B/RFM-E421	RE/BW	2006/11/27 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2007/01/06 * 12
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE/BW	2006/06/01 * 12
KOS-02	Humidity Indicator	Custom	CTH-190	RE/BW	2006/07/10 * 24
KSA-04	Spectrum Analyzer	Advantest	R3271A	RE/FT	2006/09/05 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE/BW	2007/04/12 * 12
KJM-01	Measure	TAJIMA	GL19-55	RE	-
KCH-01	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	FT	2006/12/28 * 12
KOS-07	Humidity Indicator	Custom	CTH-190	FT	2006/10/06 * 24

The expiration date of the calibration is the end of the expired month .

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 ,

BW: Bandwidth

FT: Frequency Tolerance