

EMISSION TEST REPORT

Test Report No. : **21HE0066-YW-1**

Applicant: OMRON CORPORATION

Type of Equipment: Keyless Entry System (Receiver)

Model No.: G8C-227M-G / G8C-227M-B /
G8C-227M-C / G8C-227M-D

FCC ID OUCG8C-227M-B


Test standard: FCC Part 15 Subpart B §15.109(a)


Test Result: Complies

This report may not be reproduced in full, partial reproduction may only be made with the written consent of the laboratory.

The results in this report apply only to the sample tested.

Date of test: March 27, 2001

Tested by: 
Masafumi Inui

Approved by: 
Kazutoyo Nakanishi
Section Manager of EMC section

Issued date: April 2, 2001

Testing Laboratory

A-pex International Co., Ltd.

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN

Telephone: +81 596 39 1485

Facsimile: +81 596 39 0232

Table of Contents

Page

1 GENERAL INFORMATION	3
1.1 Product Description	4
1.2 Test Specification	4
1.3 Methods & Procedures	4
1.4 Exclusion from standards	4
1.5 Test Location	4
2 SYSTEM TEST CONFIGURATION	5
2.1 Operation Environment	5
2.2 Justification	5
2.3 EUT Exercise Software	5
2.4 Test Procedure	5
Figure 2.1 Configuration of Tested System	6
3 RADIATED MEASUREMENT PHOTOS	7
Figure 3.1 Radiated Measurement Photos	7
3.1 Measurement Uncertainty	8
4 RADIATED EMISSION DATA	9
4.1 Field Strength Calculation	10
5 TEST EQUIPMENT USED	11
APPENDIX	12
A:Test Data	A1-A2

1 GENERAL INFORMATION

APPLICANT : OMRON CORPORATION

TRADE NAME : OMRON

ADDRESS : 6368 Nenjo-Zaka, Okusa, Komaki-City,
Aichi 485-0802 Japan
Tel: +81-568-78-6170
Fax: +81-568-78-6179

REGULATION(S) : FCC Part 15 Subpart B § 15.109(a)

MODEL NUMBER : G8C-227M-G / G8C-227M-B
/ G8C-227M-C / G8C-227M-D

FCC ID : OUCG8C-227M-B

SERIAL NUMBER : sample No.1

KIND OF EQUIPMENT : Keyless Entry System (Receiver)

TESTED DATE : March 27, 2001

RECEIPT DATE OF SAMPLE : March 27, 2001

REPORT FILE NUMBER : 21HE0066-YW-1

TEST SITE : A-PEX Yokowa No.2 Open Test Site

1.1 Product Description

Model: G8C-227M-G, G8C-227M-B, G8C-227M-C and G8C-227M-D (referred to as the EUT in this report) is a Keyless Entry System (Receiver).

G8C-227M-G, G8C-227M-B, G8C-227M-C and G8C-227M-D are deemed to be equal about the level of EMC since they have few differences as remarked below, therefore, G8C-227M-G which is a top-level model was measured as their representative.

Model No	PWB	Parts on PWB	Software (basic control)
G8C-227M-G	origin	origin	origin
G8C-227M-B	same as G8C-227M-G	same as G8C-227M-G	same as G8C-227M-G
G8C-227M-C	same as G8C-227M-G	Not loaded one relays(RY7)	same as G8C-227M-G
G8C-227M-D	same as G8C-227M-G	same as G8C-227M-G	same as G8C-227M-G

The specification is as following :

Type of receiver : Super Heterodyne
 Receiving Frequency : 313.85MHz
 Local Oscillator Frequency : 324.55 MHz
 Intermediate Frequency : 10.7MHz
 Other Clock Frequency : 7.43MHz
 Operation Voltage : DC 12V

1.2 Test Specification

Test Specification : FCC Part 15 Subpart B § 15.109 Radiated emission limits

Title : FCC 47CFR Part15 Radio Frequency Device
 Subpart B Unintentional Radiators

1.3 Methods & Procedures

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	FCC/ANSI C63.4:1992	§ 15.107	-
2	Radiated emission	FCC/ANSI C63.4:1992	§ 15.109(a)	3m

1.4 Exclusion from standards

No.	Item	Test Procedure	Specification	Remarks
1	Conducted emission	FCC/ANSI C63.4:1992	§ 15.107	-

* This test was not performed since EUT dose not have AC power port.

1.5 Test Location

A-PEX International Co.,Ltd. Yokowa No.2 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 October 26, 2000(Registration number: 90411) and it was accepted Industry Canada on February 19,1998(IC2973-3).

*NVLAP Lab. code : 200109-0

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

2 SYSTEM TEST CONFIGURATION

2.1 Operation Environment

Temperature : See data
Humidity : See data
Power supply : DC 12V

2.2 Justification

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

2.3 EUT Exercise Software

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

The sequence is used:

Operation Mode : Receiving

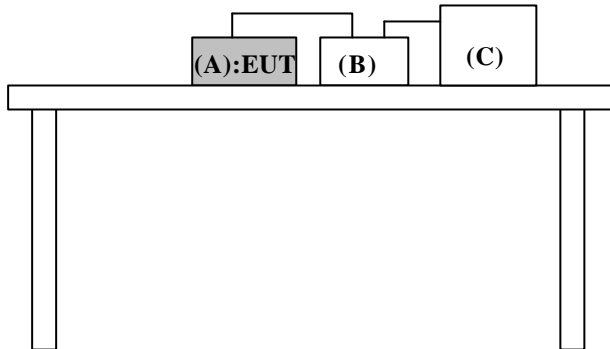
2.4 Test Procedure

Tabletop Equipment Radiated Emissions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting 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.
The measurement distance was 3m.

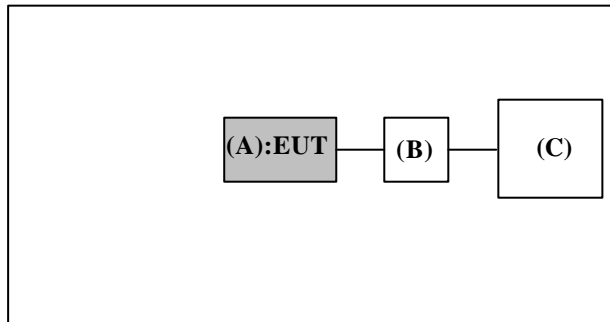
Figure2.1 Configuration of Tested System

Front View



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

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	Remark
A	Keyless Entry System (Receiver)	G8C-227M-G	Sample No.1	OMRON Corporation	EUT
B	Checker Box	N/A	N/A	OMRON Corporation	-
C	Car Battery	50B24L	N/A	YUASA	-

List of cables used

No.	Name	Length (m)	Shield	Remark
	Signal & DC Power Cable	0.9	N	-
	DC Power Cable	0.9	N	-

Test report

Our reference : 21HE0066-YW-1

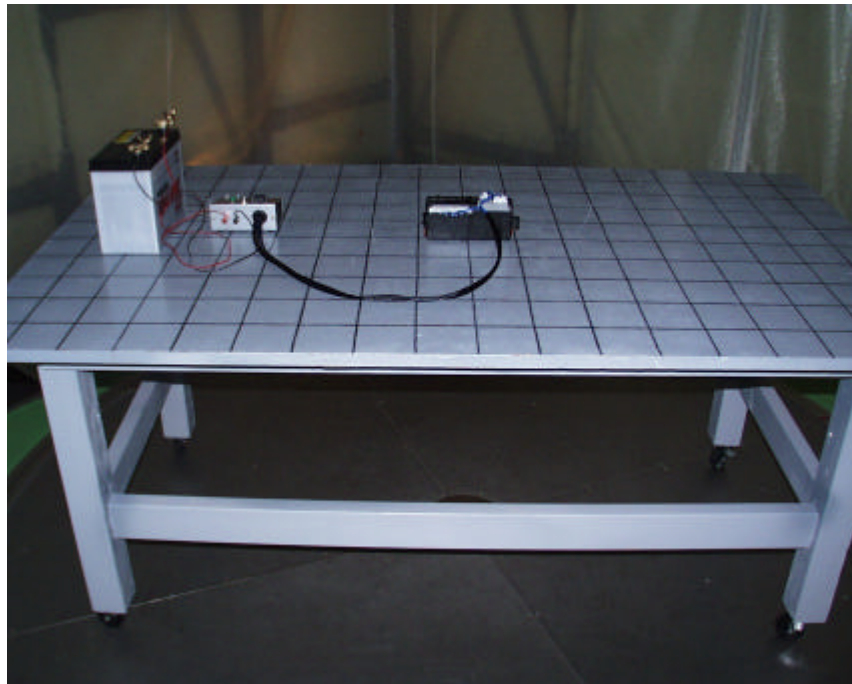
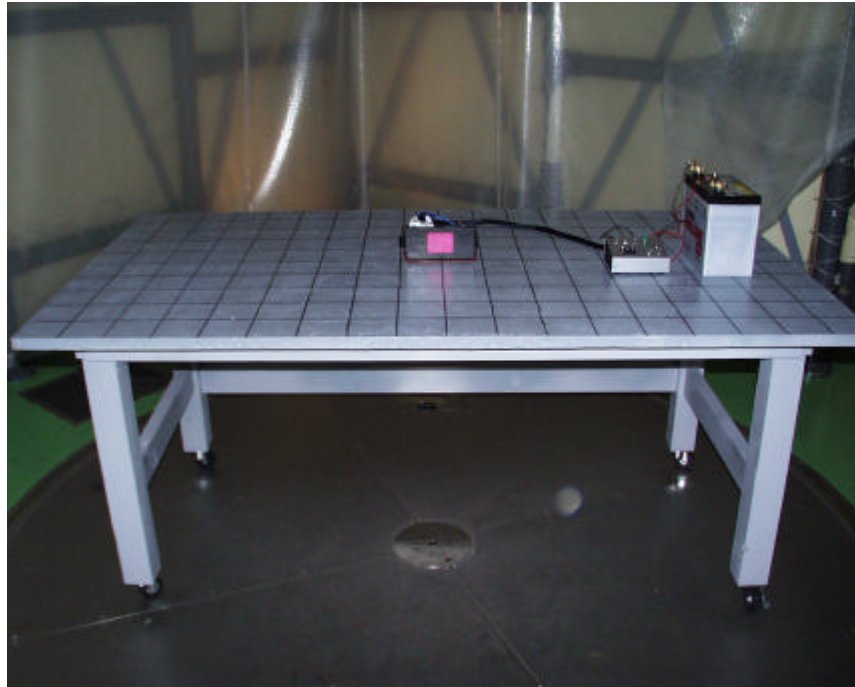
Page : 7 of 12

Issued date : April 2, 2001

FCC ID : OUCG8C-227M-B

3 RADIATED MEASUREMENT PHOTOS

Figure 3.1 Radiated Measurement Photos



Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

Test report

Our reference : 21HE0066-YW-1

Page : 8 of 12

Issued date : April 2, 2001

FCC ID : OUCG8C-227M-B

3.1 Measurement Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was $\pm 3.3\text{dB}$.

The data listed in this test report may exceed the test limit because it does not have enough margin (more than 3.3dB).

The data listed in this test report has enough margin, more than 3.3d

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

Test report

Our reference : 21HE0066-YW-1

Page : 9 of 12

Issued date : April 2, 2001

FCC ID : OUCG8C-227M-B

4 RADIATED EMISSION DATA

The initial step in collecting radiated data was a spectrum analyzer peak scan of the measurement range (30MHz-1000MHz).

The final data was reported in the worst-case emissions.

The minimum margin to the limit is as follows :

Frequency (MHz)	Ant Pol	Receiver Reading (dB μ V)	Correction Factor (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
37.11	V	29.4	-6.6	22.8	40.0	17.2

* The test receiver settings for radiated emissions measurement were as follows.

Detector Type : Quasi-Peak (CISPR)

Bandwidth : 120kHz

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

Test report

Our reference : 21HE0066-YW-1

Page : 10 of 12

Issued date : April 2, 2001

FCC ID : OUCG8C-227M-B

4.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, Cable Factor and Antenna Pad, and subtracting the Amplifier Gain from the measured reading. The sample calculation is as follows :

$$FS = RA + AF + CF + AT - AG$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Factor

AT = Antenna Pad

AG = Amplifier Gain

Assume a receiver reading of 29.4 dB μ V is obtained. The antenna Factor of 16.0 dB, Cable Factor of 1.3 dB and Antenna Pad of 5.9 dB is added. The Amplifier Gain of 29.8 dB is subtracted, giving a field strength of 22.8 dB μ V/m.

$$FS = 29.4 + 16.0 + 1.3 + 5.9 - 29.8 = 22.8 \text{ dB } \mu \text{ V/m}$$

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

Test report

Our reference : 21HE0066-YW-1

Page : 11 of 12

Issued date : April 2, 2001

FCC ID : OUCG8C-227M-B

5 Test EQUIPMENT USED

Instrument	Mfr.	Model No.	Control No.	Calibration Until // Interval
Pre Amplifier	Anritsu	MH648A	AF-03	October 21, 2001 / 1 year
Attenuator	Anritsu	MP721B	AT-04	June 8, 2001 / 1 year
Biconical Antenna	Schwarzbeck	BBA9106	BA-05	April 28, 2001 / 1 year
Logperiodic Antenna	Schwarzbeck	UKLP9140-A	LA-08	April 29, 2001 / 1 year
Spectrum Analyzer	Hewlett Packard	8567A	SA-03	April 21, 2001 / 6 months
Test Receiver	Rohde & Schwarz	ESVS10	TR-04	July 13, 2001 / 1 year

*All measurement equipment is traceable to national standard.

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

APPENDIX

A : Test Data

Radiated emissions (§15.109)

A1 – A2

Testing Laboratory

A-pex International Co., Ltd.

Telephone: +81 596 39 1485

108 Yokowa-cho, Ise-shi Mie-ken 516-1106 JAPAN Facsimile: +81 596 39 0232

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.2 OPEN TEST SITE
Report No. : 21HE0066-YW-1

Applicant : OMRON Corporation
 Kind of Equipment : Keyless Entry System
 Model No. : G8C-227M-G
 Serial No. : sample No. 1
 Power : DC12V
 Mode : Receiving
 Remarks : FCC ID: OUCG8C-227M-B
 Date : 3/27/2001
 Test Distance : 3 m
 Temperature : 22 °C
 Humidity : 39 %
 Regulation : FCC Part15B. 109(a)



 Engineer : Masafumi Inui

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]	HOR [dB]	VER [dB]		
1.	37.11	BB	27.9	29.4	16.0	29.8	1.3	5.9	21.3	22.8	40.0	18.7	17.2	
2.	118.89	BB	26.0	26.1	13.3	29.8	2.4	5.9	17.8	17.9	43.5	25.7	25.6	
3.	156.04	BB	26.0	27.5	15.1	29.7	3.0	5.9	20.3	21.8	43.5	23.2	21.7	
4.	208.05	BB	22.5	25.6	16.5	29.7	3.4	5.9	18.6	21.7	43.5	24.9	21.8	
5.	319.50	BB	22.0	23.1	16.8	29.8	4.3	5.9	19.2	20.3	46.0	26.8	25.7	
6.	324.59	BB	22.3	22.1	16.9	29.8	4.3	5.9	19.6	19.4	46.0	26.4	26.6	
7.	649.09	BB	22.0	21.9	20.7	29.8	6.6	5.9	25.4	25.3	46.0	20.6	20.7	
8.	973.65	BB	21.0	21.5	26.4	28.4	8.3	5.8	33.1	33.6	54.0	20.9	20.4	

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

Except for the above table: adequate margin data below the limits.
 ANT. TYPE : 30-300MHz Biconical , 300-1000MHz Logperiodic

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
 YOKOWA No.2 OPEN TEST SITE
 Report No. : 21HE0066-YW-1

Applicant : OMRON Corporation
 Kind of Equipment : Keyless Entry System
 Model No. : G8C-227M-G
 Serial No. : sample No. 1
 Power : DC12V
 Mode : Receiving
 Remarks : FCC ID: OUCG8C-227M-B
 Date : 3/27/2001
 Test Distance : 3 m
 Temperature : 22 °C
 Humidity : 39 %
 Regulation : FCC Part15B. 109(a)



 Engineer : Masafumi Inui

