



# RADIO TEST REPORT

**Test Report No. : 31DE0293-HO-02-A-R1**

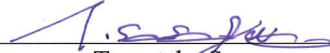
**Applicant** : Omron Corporation  
**Type of Equipment** : ETACS  
**Model No.** : G8C-930M  
**FCC ID** : OUCG8C-930M  
**Test regulation** : FCC Part 15 Subpart C: 2010  
**Test Result** : Complied

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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.
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6. This report is a revised version of 31DE0293-HO-02-A. 31DE0293-HO-02-A is replaced with this report.

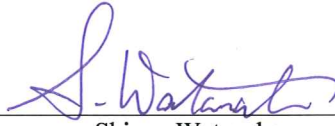
**Date of test:**

December 7 and 8, 2010

**Representative  
test engineer:**

  
Tomotaka Sasagawa  
Engineer of EMC Service

**Approved by:**

  
Shinya Watanabe  
Leader of EMC Service

**NVLAP**<sup>®</sup>

NVLAP LAB CODE: 200572-0

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MF058b (15.09.10)

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## **SECTION 1: Customer information**

Company Name : Omron Corporation  
Address : 6368 NEJOZAKA OKUSA KOMAKI AICHI 485-0802 JAPAN  
Telephone Number : +81-568-78-6159  
Facsimile Number : +81-568-78-7659  
Contact Person : Masashi Matsuda

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

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

Type of Equipment : ETACS  
Model No. : G8C-930M  
Serial No. : Please refer to Section 4 Clause 4.2  
Rating : DC12V (Car Battery)  
Receipt Date of Sample : December 6, 2010  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is not mass-produced items.)  
Modification of EUT : No Modification by the test lab

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## 2.2 Product description

Model No: G8C-930M, (referred to as the EUT in this report), is the ETACS.

This EUT is to lock and unlock doors (gate/trunk) by receiving RF signal output by the operation of the registered transmitter (remote transmitter, hereafter referred to as T/M).

Also, the immobilizer function for antitheft and remote engine starter function to start up/stop an engine by where the key is placed to start the engine.

There are following models as ETACS;

-Standard type (with Immobilizer and Keyless Receiver) : G8C-930M (tested model in this report)

-Type without Immobilizer /with Keyless Receiver : G8C-931M

-Type with Immobilizer /without Keyless Receiver : G8C-932M

### General Specification

Clock frequency(ies) in the system : 8MHz and 32MHz and 13.225625MHz  
Power Supply : DC12V

### Radio Specification

#### [Immobilizer part]

Radio Type : Transceiver  
Frequency of Operation : 125kHz  
Modulation : BPLM  
Antenna type : Coil Antenna  
Operating voltage (inner) : DC5.0V

#### [UHF part \*]

Equipment type : Receiver  
Type of Receiver : Super Heterodyne  
Frequency of Operation : 433.92MHz  
Oscillator Frequency : 13.225625MHz (Crystal)  
Local Oscillator Frequency : 423.22MHz (13.225625MHz \* 32)  
Intermediate frequency : 10.7MHz  
Antenna type : L type Antenna (Built-in)  
Method of Frequency Generation : Crystal  
Operating voltage (inner) : DC5.0V

\*UHF part was tested according to FCC15B standard. Please see UL Japan, Inc. test report No. 31DE0293-HO-02-B.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C: 2010, final revised on October 13, 2010

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted Emission  
Section 15.209 Radiated emission limits, general requirements

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

This EUT provides stable voltage (DC5.0V) constantly to RF Part 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	Section 15.207	-	N/A *1)	N/A	N/A
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.209	Radiated	N/A	40.5dB 0.12500MHz 0 deg. AV	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.209	Radiated	N/A	11.2dB 40.016MHz, Vertical, QP	Complied
4	-26dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Reference data	Radiated	N/A	N/A	N/A

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

\*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

#### EMI

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

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	3.5dB	5.1dB	5.2dB	4.8dB	5.1dB	4.4dB	4.3dB
No.2	4.0dB	5.1dB	5.2dB	4.8dB	5.0dB	4.3dB	4.2dB
No.3	4.2dB	4.7dB	5.2dB	4.8dB	5.0dB	4.5dB	4.2dB
No.4	4.0dB	5.0dB	5.1dB	4.8dB	5.0dB	5.1dB	4.2dB

\*3m/1m/0.5m = Measurement distance

#### Radiated emission test (3m)

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

### 3.5 Test Location

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	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, Data of EMI, and Test instruments

Refer to APPENDIX.

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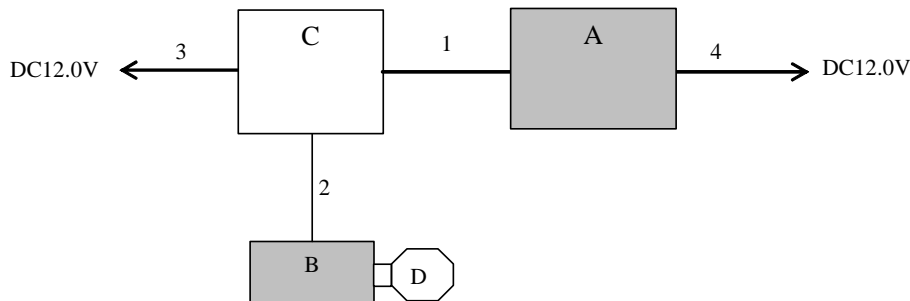
## SECTION 4: Operation of E.U.T. during testing

### 4.1 Operating Modes

Test mode	Remarks
Transmitting mode (125kHz)	-

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

### 4.2 Configuration and peripherals



\* Cabling and setup were 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	ETACS	G8C-930M	No.1	Omron Corporation	EUT
B	Key Cylinder	-	No.1	Omron Corporation	EUT
C	Simulator	-	-	-	-
D	Transponder *1)	-	-	Omron Corporation	-

\*1) This transponder is auxiliary (function) of Keyless Transmitter (Model No.G8D-571M-A).

The test was performed without Item D, since it was the worst case as a result of comparing to test with Item D inserted into Item B.

#### List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal Cable 1	1.0	Unshielded	Unshielded	-
2	Signal Cable 2	0.4	Unshielded	Unshielded	-
3	DC Cable	1.0	Unshielded	Unshielded	-
4	DC Cable	0.8	Unshielded	Unshielded	-

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**SECTION 5: Radiated emission (Fundamental and Spurious Emission)**

**Test Procedure**

The Radiated Electric Field Strength intensity has been measured on No 4 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 vertical polarization (antenna angle: 0deg., 45deg., 90deg., and 135 deg.) and horizontal polarization.

\*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency : From 30MHz to 1GHz at distance 3m

The measuring antenna height 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 (below 1GHz).

	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 and noise levels were measured at each position of all three axes X, Y and Z, 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)

[Limit at 3m]=[Limit at 300m]-40 x log (3[m]/300[m])

[Limit at 3m]=[Limit at 30m]-40 x log (3[m]/30[m])

**Test data** : APPENDIX 2

**Test result** : Pass

Date: December 8, 2010

Test engineer: Tomotaka Sasagawa

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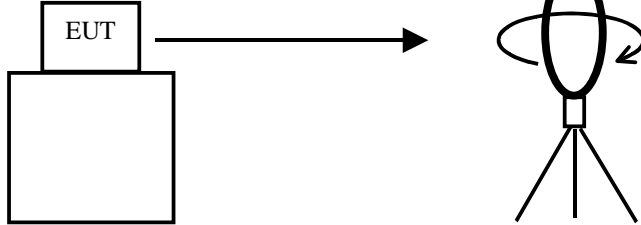
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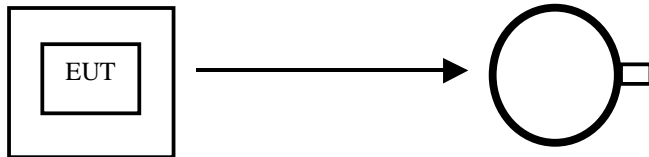


**Figure 1: Direction of the Loop Antenna**

*Side View (Vertical)*



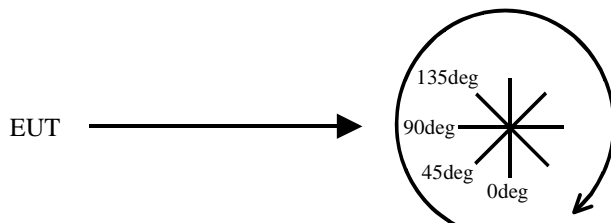
*Top View (Horizontal)*



Antenna was not rotated.

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*Top View (Vertical)*



Front side: 0 deg.  
Forward direction: clockwise

## **SECTION 6: -26dB Bandwidth**

### **Test Procedure**

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

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
-26dB Bandwidth	100kHz	1kHz	3kHz	Auto	Peak	Max Hold	Spectrum Analyzer

Test data : APPENDIX 2  
Test result : Pass