

RADIO TEST REPORT

Test Report No. : 29KE0169-HO-01-A-R1

Applicant : OMRON Corporation
Type of Equipment : Wireless control module
Model No. : G8D-841M-WCM-N
FCC ID : OUCG8D841MWCM
Test regulation : FCC Part 15 Subpart B 2010 Section 15.109
FCC Part 15 Subpart C 2010 Section 15.209
Test Result : Complied

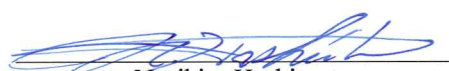
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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
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6. This report is a revised version of 29KE0169-HO-01-A. 29KE0169-HO-01-A is replaced with this report.

Date of test:

February 18, 2010

Tested by:


Katsunori Okai
EMC Services


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Approved by:


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MF060b (06.08.09)

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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
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Contact Person : Masashi Matsuda

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless control module
Model No. : G8D-841M-WCM-N
Serial No. : See Clause 4.2
Receipt Date of Sample : February 18, 2010
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No: G8D-841M-WCM-N, (referred to as the EUT in this report), is the Wireless control module.
The clock frequency of EUT is 16MHz(CPU) or 8MHz or 10.178125MHz.

Feature of EUT : 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).
Immobilizer function for antitheft and remote engine starter function to start up/stop an engine by pressing a button of a separate transmitter (remote control engine starter) is also installed.
Operating Voltage (Inner) : DC5.0V*
*The stable voltage (DC5.0V) is provided to RF part regardless of input voltage fluctuation (Car Battery).

Immobilizer part (LF Transmitting part)

Equipment Type : Transceiver
Frequency of Operation : 125kHz
Type of Modulation : BPLM
Antenna Type : Coil Antenna
Method of Frequency Generation : Ceramic Resonator (125kHz =8MHz /64)

UHF part (RF Receiving part)

Equipment Type : Receiver
Type of Receiver : Super Heterodyne
Receiving Frequency : 315MHz
Oscillator Frequency : 10.178125MHz (Crystal)
Local Oscillator Frequency : 325.7MHz (10.178125MHz * 32)
Intermediate Frequency : 10.7MHz
Antenna Type : S type Antenna (Built-in)
Method of Frequency Generation : Crystal

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart B: 2010, final revised on January 22, 2010 and effective March 1, 2010

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

Test Specification : FCC Part15 Subpart C: 2010, final revised on January 22, 2010 and effective March 1, 2010

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

*The revision on January 22, 2010 does not affect the test specification applied to the EUT.

FCC 15.31(e)

The EUT provides the stable voltage (DC5V) constantly to RF part regardless of input voltage. Therefore, the EUT complies with the requirement.

FCC15.111(b)

The receiving antenna (of Wireless control module) is installed inside the Wireless control module and cannot be removed (permanently attached). Therefore, Radiated emission test was performed.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the Immobilizer antenna, because it is mounted inside of the vehicle and users cannot access it. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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3.2 Procedures and results

<FCC Part15 Subpart B (RF Receiving part)>

No	Item	Test Procedure	Limits	Deviation	Worst margin	Results
1	Conducted emission	<FCC> ANSI C63.4: 2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.	Receiver	N/A *1)	N/A	N/A
2	Radiated emission	<FCC> ANSI C63.4: 2003 8. Radiated emission measurements <IC> RSS-Gen 4.10	Receiver	N/A	21.3dB 651.400MHz, Vertical	Complied

*Note: UL Japan, Inc's EMI Work Procedure QPM05.

*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.

<FCC Part15 Subpart C (LF Transmitting part)>

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	<FCC> ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.2	<FCC> Section 15.207 <IC> RSS-Gen 7.2.2	-	N/A *1)	N/A	N/A
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	24.8dB 0.12512MHz AV	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.9, 4.11	<FCC> Section 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	9.2dB 30.028MHz Vertical	Complied
4	-26dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Reference data <IC> -	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.

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3.3 Addition to standard

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	<IC> RSS-Gen 4.6.1	<IC> RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

Other than above, no addition, exclusion nor deviation has been made from the standard.

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)	Conducted emission (+dB)
	150kHz-30MHz
No.1	2.6dB
No.2	2.9dB
No.3	3.3dB
No.4	2.8dB

Test room (semi-anechoic chamber)	Radiated emission (10m*)(±dB)			Radiated emission					
				(3m*)(±dB)					(1m*)(±dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	2.7dB	4.8dB	5.0dB	2.9dB	4.8dB	5.0dB	3.9dB	4.5dB	4.4dB
No.2	-	-	-	3.5dB	4.8dB	5.1dB	4.0dB	4.3dB	4.2dB
No.3	-	-	-	3.8dB	4.6dB	4.7dB	4.0dB	4.5dB	4.4dB
No.4	-	-	-	3.5dB	4.4dB	4.9dB	4.0dB	4.6dB	4.5dB

*10m/3m/1m = Measurement distance

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

Radiated emission test(3m)

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

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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 1 to 3.

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

4.1 Operating Modes

The mode is used :
1. Continuous Transmitting mode (125kHz) *1)
2. RF Receiving mode (315MHz) *2)

*1) Test was performed without Key since the carrier level and noise levels of the test without Key were higher at spurious emission test for 9MHz-30MHz and 30MHz-1000MHz.

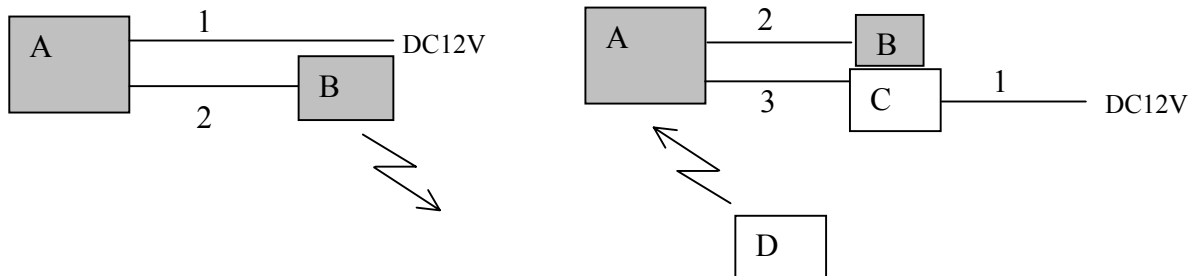
*2) FOB(G8D-625M-A) was operated manually by a test engineer, and the test was performed with the EUT receiving 315MHz.

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

4.2 Configuration and peripherals

1. Continuous Transmitting mode (125kHz)

2. RF Receiving mode (315MHz)



* 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	Remarks
A	Wireless control module	G8D-841M-WCM-N	001 *1) 002 *2)	OMRON Corporation	EUT
B	Immobilizer ANT + Key Cylinder	4408A138 + 6371A151	004	Yu-shin	EUT
C	Dummy ECU	-	003	OMRON Corporation	-
D	FOB	G8D-625M-A	18Y9D1	OMRON Corporation	-

*1) For Continuous Transmitting mode (125kHz)

*2) For RF Receiving mode (315MHz)

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	Signal Cable	1.5	Unshielded	Unshielded	-
3	Signal Cable	1.5	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 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 vertical polarization (rotate 0deg. to 360 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) and the spectrum analyzer (above 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	From 1GHz to 2GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP	PK/ AV*1)
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz	1MHz

*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z of the EUT and Immobilizer ANT + Key Cylinder, 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: February 18, 2010

Test engineer: Katsunori Okai and Norihisa Hashimoto

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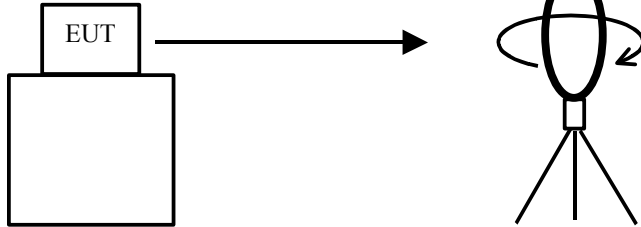
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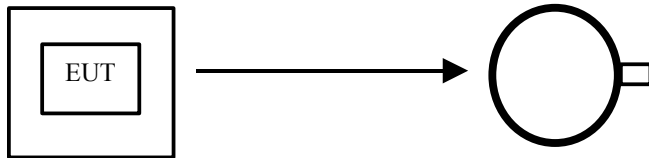
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Figure 1: Direction of the Loop Antenna

Side View (Vertical)

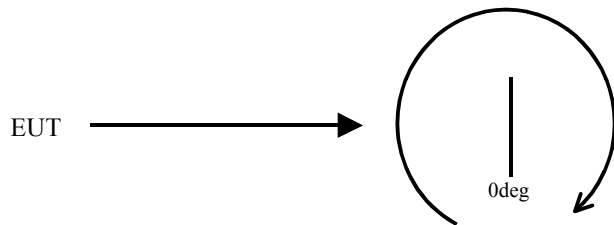


.....
Top View (Horizontal)



Antenna was not rotated.

.....
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 data : APPENDIX 2
Test result : Pass

SECTION 7: 99% Occupied Bandwidth

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass