

RADIO TEST REPORT

Test Report No.: 26GE0263-HO-B

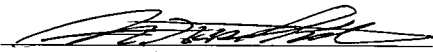
Applicant : OMRON Corporation
Type of Equipment : WCM
Model No. : G8D-648M
Test standard : FCC Part 15 Subpart B Section 15.109: 2006
FCC Part 15 Subpart C Section 15.209: 2006
FCC ID : OUCG8D-648M
Test Result : Complied

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


Date of test:

April 12 to 14, 2006

Tested by:


Norihisa Hashimoto
EMC Services

Approved by :


Naoki Sakamoto
Group Leader of
EMC Services

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

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SECTION 1: Client information

Company Name : OMRON Corporation
Address : 6368 Nenjozaka, Okusa, Komaki, Aichi, 485-0802 Japan
Telephone Number : +81- 568-78-6394
Facsimile Number : +81- 568-78-7659
Contact Person : Harumi Itatsu

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

2.1 Identification of E.U.T.

Type of Equipment : WCM
Model No. : G8D-648M
Serial No. : WU0001 for 315MHz Receiver Test
WU0002 for 125kHz Transmitter Test
Rating : DC12.0V
Country of Manufacture : Japan
Receipt Date of Sample : April 3, 2006
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-648M (referred to as the EUT in this report) is the WCM.

Equipment Type : Transceiver
[Transmitter part]
Frequency of Operation : 125kHz +/-0.1kHz
Type of modulation : BPLM
Power Control : No
ITU code : N0N
Antenna Type : Coil Antenna
[Receiver part]
Type of Receiver : Super Heterodyne
Frequency of Operation : 315MHz
Intermediate Frequency : 10.7MHz
Antenna Type : Integral Antenna (Inverted F Antenna)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart B: 2006
Title : FCC 47CFR Part15 Radio Frequency Device Subpart B Unintentional Radiators

Test Specification : FCC Part15 Subpart C: 2006
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.209 Radiated emission limits, general requirements: 2006

FCC 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery. Therefore, this EUT complies with the requirement.

FCC 15.111 (b)

The receiving antenna is installed in the EUT and cannot be removed by the user. 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.

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3.2 Procedures and results

<315MHz Receiver part>

No.	Item	Test Procedure	Limits	Deviation	Worst margin *0)	Result
1	Conducted emission	<FCC> ANSI C63.4: 2003 7. AC powerline conducted emission measurements <IC>RSS-Gen 7.2.2	Class B	N/A *1)	N/A	N/A
2	Radiated emission	<FCC> ANSI C63.4: 2003 8. Radiated emission measurements <IC>RSS-Gen 4.8	Class B	N/A	22.3dB 750.108MHz, Vert., 751.508MHz, Hori., QP	Complied

*Note: UL Apex's EMI Work Procedure QPM05.

*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

*1) The test is not applicable since the EUT does not have AC Mains.

<125kHz Transmitter part>

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin *0)	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 4.6, 4.9	<FCC> Section 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	52.0dB 125.10kHz 0 deg. AV	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC>RSS-Gen 4.7, 4.9	<FCC> Section 15.205, 15.209 <IC> RSS-210 2.6, 2.7	Radiated	N/A	19.5dB 31.623MHz, Vertical, QP	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 Apex's EMI Work Procedures No.QPM05 and QPM15.

*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

*1) The test is not applicable since the EUT does not have AC Mains.

*These tests were performed without any deviations from test procedure except for additions or exclusions.

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	<IC>RSS-Gen 4.4.1	<IC>RSS-Gen 4.4.1	Radiated	N/A	N/A	N/A

3.4 Uncertainty

Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is $\pm 4.59\text{dB}(3\text{m})/\pm 4.58\text{dB}(10\text{m})$.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is $\pm 4.62\text{dB}(3\text{m})/\pm 4.60\text{dB}(10\text{m})$.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is $\pm 5.27\text{dB}$.

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

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test is $\pm 3.0\text{dB}$.

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone: +81 596 24 8116

Facsimile : +81 596 24 8124

	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	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 shielded room	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	N/A	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	N/A	-
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	-

* 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.7 shielded room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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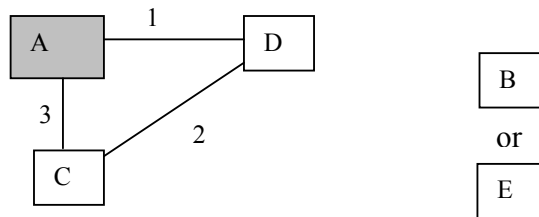
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : 125kHz Transmitting Mode / 315MHz Receiving Mode

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

No	Item	Model number	Serial number	Manufacturer	Remarks
A	WCM	G8D-648M	WU0002 *1) WU0001 *2)	OMRON Corporation	EUT
B	KEY *1)	-	-	-	-
C	Checker	-	-	OMRON Corporation	-
D	Car battery	40B19L	-	YUASA	-
E	FOB *2)	G8D-625M-A	WK0001	OMRON Corporation	-

*1) Used for 125kHz Tx Test

*2) Used for 315MHz Rx Test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.45	Unshielded	Unshielded	-
2	DC Cable	1.45	Unshielded	Unshielded	-
3	Signal Cable	1.45	Unshielded	Unshielded	-

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SECTION 5: Radiated emission (Fundamental and Spurious Emission and -26dB Bandwidth)

Test Procedure

The Radiated Electric Field Strength intensity has been measured on No.1 and 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 each antenna angle 0deg. , 45deg. and 90deg.

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.

<315MHz Receiver part >

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.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz

<125kHz Transmitter part >

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.

	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 (or, noise levels) was (or 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 3

Test result : Pass

Date: April 12, 13, and 14, 2006

Test engineer: Norihisa Hashimoto

UL Apex Co., Ltd.

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