



# RADIO TEST REPORT

Test Report No. : 31EE0173-HO-01-A-R1

**Applicant** : Omron Corporation  
**Type of Equipment** : FOB  
**Model No.** : G8D-625M-A-HF  
**Test regulation** : FCC Part 15 Subpart C: 2010  
**FCC ID** : OUCG8D-625M-A-HF  
**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.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 31EE0173-HO-01-A. 31EE0173-HO-01-A is replaced with this report.

**Date of test:** February 17, 2011

**Representative test engineer:**

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**Approved by:**

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NVLAP LAB CODE: 200572-0

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## **SECTION 1: Customer information**

Company Name : Omron Corporation  
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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 : FOB  
Model No. : G8D-625M-A-HF  
Serial No. : Refer to Clause 4.2  
Rating : DC3.0V  
Receipt Date of Sample : February 17, 2011  
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**

#### **General Specification**

Clock frequency(ies) in the system : CPU: 2MHz

#### **Radio Specification**

Radio Type : Transmitter  
Frequency of Operation : 315MHz  
Modulation : FSK  
ITU code : F1D  
Power Supply (radio part input) : DC 2.5-3.5V  
Antenna type : Pattern Antenna

#### **Variant model**

EUT has a variant model:G8D-625M-A-HF-NT, and the difference between the two is number of button.

- G8D-625M-A-HF (EUT): LOCK, UNLOCK, BOOT RELEASE, PANIC (4 buttons)
- G8D-625M-A-HF-NT: LOCK, UNLOCK, PANIC (3 buttons)

The difference does not influence on the radio specification.

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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 December 6, 2010 and effective January 5, 2011

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.231 Periodic operation in the band 40.66 - 40.70MHz and above 70MHz

### **3.2 Procedures and results**

| Item  | Test Procedure   | Specification  | Worst margin  | Results  | Remarks  |
|---|--|--|---|----------|----------|
| Conducted emission                              | FCC: ANSI C63.4:2003<br>7. AC powerline conducted emission measurements<br>IC: RSS-Gen 7.2.4 | FCC: Section 15.207<br>-----<br>IC: RSS-Gen 7.2.4  | N/A   | N/A*1)   | -        |
| Automatically Deactivate                        | FCC: ANSI C63.4:2003<br>13. Measurement of intentional radiators<br>IC: -                    | FCC: Section 15.231(a)(1)<br>-----<br>IC: RSS-210 A1.1.1   | N/A   | Complied | Radiated |
| Electric Field Strength of Fundamental Emission | FCC: ANSI C63.4:2003<br>13. Measurement of intentional radiators<br>IC: RSS-Gen 4.8          | FCC: Section 15.231(b)<br>-----<br>IC: RSS-210 A1.1.2  | 6.1dB,<br>315.000MHz,<br>Horizontal,<br>PK with Duty factor | Complied | Radiated |
| Electric Field Strength of Spurious Emission    | FCC: ANSI C63.4:2003<br>13. Measurement of intentional radiators<br>IC: RSS-Gen 4.9          | FCC: Section 15.205<br>Section 15.209<br>Section 15.231(b)<br>IC: RSS-210 A1.1.2, 2.5.1<br>RSS-Gen 7.2.5 | 2.4dB,<br>1575.000MHz,<br>Vertical,<br>PK with Duty factor  | Complied | Radiated |
| -20dB Bandwidth                                 | FCC: ANSI C63.4:2003<br>13. Measurement of intentional radiators<br>IC: -                    | FCC: Section 15.231(c)<br>-----<br>IC: Reference data  | N/A   | Complied | Radiated |

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

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

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

This test was performed with the New Battery (DC 3.0V) and the constant voltage was supplied to the EUT during the tests. Therefore, the 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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### 3.3 Addition to standard

| Item                   | Test Procedure    | Specification     | Worst margin | Results | Remarks  |
|------------------------|-------------------|-------------------|--------------|---------|----------|
| 99% Occupied Bandwidth | IC: RSS-Gen 4.6.1 | IC: RSS-Gen 4.6.1 | N/A          | -       | Radiated |

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<br>(semi-anechoic chamber) | Radiated emission |                  |                 |                |                 |                   |                   |
|--------------------------------------|-------------------|------------------|-----------------|----------------|-----------------|-------------------|-------------------|
|                                      | (3m*)(+dB)        |                  |                 |                | (1m*)(+dB)      |                   | (0.5m*)(+dB)      |
|                                      | 9kHz<br>-30MHz    | 30MHz<br>-300MHz | 300MHz<br>-1GHz | 1GHz<br>-10GHz | 10GHz<br>-18GHz | 18GHz<br>-26.5GHz | 26.5GHz<br>-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

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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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, Test instruments.

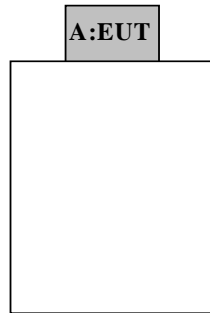
Refer to APPENDIX.

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

### **4.1 Operating Modes**

| <b>Test Item*</b>   | <b>Mode</b>                |
|---|----------------------------|
| Automatically Deactivate<br>Duty Cycle  | Normal use mode            |
| Electric Field Strength of Fundamental Emission<br>Electric Field Strength of Spurious Emission<br>-20dB & 99% Occupied Bandwidth   | Transmitting mode (Tx) *1) |
| <p>* The system was configured in typical fashion (as a customer would normally use it) for testing.<br/> *1) The software of this mode is the same as one of normal product, except that EUT continues to transmit when transmitter button is being pressed (For Normal use mode, EUT stops to transmit in a given time, even if transceiver button is being pressed.)<br/> End users cannot change the settings of the output power of the product.</p> |                            |

### **4.2 Configuration and peripherals**



\* Test data was taken under worse case conditions.

### **Description of EUT**

| <b>No.</b> | <b>Item</b> | <b>Model number</b> | <b>Serial number</b> | <b>Manufacturer</b> | <b>Remarks</b> |
|------------|-------------|---------------------|----------------------|---------------------|----------------|
| A          | FOB         | G8D-625M-A-HF       | 001 *1)<br>002 *2)   | Omron Corporation   | EUT            |

\*1) Used for Normal use mode

\*2) Used for Transmitting mode

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**SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission)**

**Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The EUT was set on the center of the tabletop. 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. Photographs of the set up are shown in Appendix 1.

**[Transmitting mode]**

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 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 strength.

The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detector function of the test receiver/spectrum analyzer.

**Test Antennas are used as below;**

|              |             |                 |                |            |
|--------------|-------------|-----------------|----------------|------------|
| Frequency    | Below 30MHz | 30MHz to 300MHz | 300MHz to 1GHz | Above 1GHz |
| Antenna Type | Loop        | Biconical       | Logperiodic    | Horn       |

|               |                                |                                |
|---------------|--------------------------------|--------------------------------|
|               | Below or equal to 1GHz         | Above 1GHz                     |
| Detector Type | Peak and Peak with Duty factor | Peak and Peak with Duty factor |
| IF Bandwidth  | 120kHz                         | PK: S/A:RBW 1MHz, VBW:3MHz     |

- 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.

Noise levels of all the frequencies were measured at the position.

\*The result is rounded off to the second decimal place, so some differences might be observed.

**Measurement range** : 30MHz-3.2GHz

**Test data** : APPENDIX

**Test result** : Pass

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## **SECTION 6: Automatically deactivate**

### **Test Procedure**

The measurement was performed with Electric field strength using a spectrum analyzer.

**Test data** : APPENDIX  
**Test result** : Pass

## **SECTION 7: -20dB and 99% Occupied 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   |
|------------------------|--|-------------|--------------------|-------|----------|--------------|-------------------|
| 20dB Bandwidth         | 2MHz                                   | 10kHz       | 30kHz              | Auto  | Peak     | Max Hold     | Spectrum Analyzer |
| 99% Occupied Bandwidth | Enough width to display 20dB Bandwidth | 1 % of Span | Three times of RBW | Auto  | Peak *1) | Max Hold *1) | Spectrum Analyzer |

\*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.

**Test data** : APPENDIX  
**Test result** : Pass