



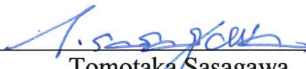
# EMI TEST REPORT


Test Report No. : 29JE0145-HO-02-A

**Applicant** : Mitsubishi Electric Corporation Himeji Works  
**Type of Equipment** : NORMAL KEYLESS SYSTEM (RECEIVER)  
**Model No.** : SKE125-01 (X1T855 VARIANT)  
**FCC ID** : WAZX1T855SKE12501  
**Test regulation** : FCC Part 15 Subpart B 2009  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the 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 product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

**Date of test:** May 28, 2009

**Tested by:**   
Tomotaka Sasagawa  
EMC Services

**Approved by:**   
Makoto Kosaka  
EMC Services



NVLAP LAB CODE: 200572-0

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\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,

<http://uljapan.co.jp/emc/nvlap.html>

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## **SECTION 1: Customer information**

Company Name : Mitsubishi Electric Corporation Himeji Works  
Address : 840 CHIYODA-MACHI HIMEJI HYOGO 670-8677, JAPAN  
Telephone Number : +81-79-298-8994  
Facsimile Number : +81-79-298-9929  
Contact Person : Yoshiharu Goto

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

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

Type of Equipment : NORMAL KEYLESS SYSTEM (RECEIVER)  
Model No. : SKE125-01 (X1T855 VARIANT)  
Serial No. : 1  
Receipt Date of Sample : May 28, 2009  
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: SKE125-01 (X1T855 VARIANT) (referred to as the EUT in this report) is the NORMAL KEYLESS SYSTEM (RECEIVER). Original receiver (Model No: SKE125-01) was tested before. This model is X1T855 VARIANT of original model.

Clock frequency(ies) in the system : 8MHz(CPU)  
Equipment Type : Receiver  
  
Type of Receiver : Super Heterodyne  
Frequency of Operation : 315MHz  
Oscillator Frequency : 29.509394MHz(Crystal)  
(29.509394MHz / 3)×32=314.767MHz (Local Oscillator Frequency)  
Intermediate Frequency : 233kHz  
Antenna Type : Bar antenna  
Method of Frequency Generation : Crystal  
Operating voltage (Inner) : DC 5.0V

### **FCC15.111(b)**

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

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

### **3.1 Test specification**

Test Specification : FCC Part 15 Subpart B 2009, final revised on February 27, 2009  
Title : FCC 47CFR Part15 Radio Frequency Device  
Subpart B Unintentional Radiators

### **3.2 Procedures and results**

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	FCC: ANSI C63.4: 2003 7. AC powerline conducted emission measurements ----- IC: RSS-Gen 7.2.2	Receiver	N/A *1)	N/A	N/A
Radiated emission	FCC: ANSI C63.4: 2003 8. Radiated emission measurements ----- IC: RSS-Gen 4.10	Receiver	N/A	18.1dB 959.401MHz Horizontal, QP	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.

### **3.3 Addition to standard**

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	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission (3m*)	
	150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-40GHz
No.1 semi-anechoic chamber (±)	3.7dB	3.1dB	4.4dB	4.2dB	3.2dB	3.8dB	3.9dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.4dB	4.0dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.6dB	4.0dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	3.9dB	3.9dB	5.9dB	6.1dB

\*10m/3m = Measurement distance

#### **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

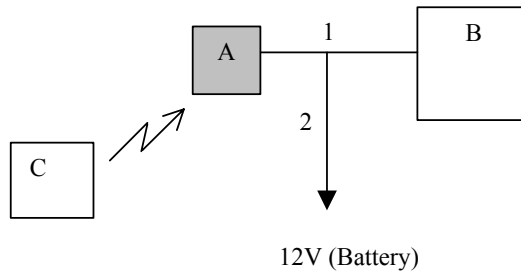
Refer to APPENDIX 1 to 3.

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

### **4.1 Operating modes**

The mode is used : Continuous Receiving mode  
\* This EUT receives 315MHz signal from hand unit.  
\*\* Key (Transmitter) was operated manually by a test engineer and the test was performed with the EUT receiving 315MHz.

### **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	NORMAL KEYLESS SYSTEM (RECEIVER)	SKE125-01 (X1T855 VARIANT)	1	Mitsubishi Electric Corporation Himeji Works	EUT
B	BCM	-	-	Mitsubishi Electric Corporation Himeji Works	-
C	Key (Transmitter)	-	-	Mitsubishi Electric Corporation Himeji Works	-

#### **List of cables used**

No.	Name	Length (m)	Shield	
			Cable	Connector
1	DC & Signal Cable	1.5	Unshielded	Unshielded
2	DC Cable	0.5	Unshielded	Unshielded

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## **SECTION 5: Radiated Emission**

### **5.1 Operating environment**

Test place : No.3 semi anechoic chamber  
Temperature : See data  
Humidity : See data

### **5.2 Test configuration**

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.

### **5.3 Test conditions**

Frequency range : 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)  
1000MHz-2000MHz (Horn antenna)  
Test distance : 3m  
EUT position : Table top  
EUT operation mode : See Clause 4.1

### **5.4 Test procedure**

The height of the measuring antenna 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 with the Test Receiver, or the Spectrum Analyzer.  
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer *1)
IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz AV *2): RBW:1MHz/VBW:10Hz

\*1) The Spectrum Analyzer was used in 3dB resolution bandwidth.

\*2) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

- The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

### **5.5 Test result**

Summary of the test results: Pass

Date: May 28, 2009

Test engineer: Tomotaka Sasagawa

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