



## EMI TEST REPORT

Test Report No. : 28FE0186-HO-A-R1

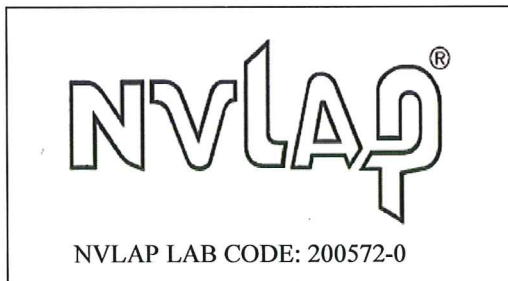
Applicant : DENSO CORPORATION  
Type of Equipment : Remote Keyless Entry System (Receiver)  
Model No. : 13CZG  
FCC ID : HYQ13CZG  
Test regulation : FCC Part 15 Subpart B 2008  
Test Result : Complied

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. Original test report number of this report is 28FE0186-HO-A.

Date of test: February 5, 2008

Tested by:   
Kenichi Adachi  
EMC Services

Approved by :   
Makoto Kosaka  
EMC Services



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address,  
<http://uljapan.co.jp/emc/nvlap.htm>

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MF060b (09.01.08)

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## **SECTION 1: Customer information**

Company Name : DENSO CORPORATION  
Address : 1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan

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

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

Type of Equipment : Remote Keyless Entry System (Receiver)  
Model No. : 13CZG  
Serial No. : 1  
Country of Manufacture : Japan  
Receipt Date of Sample : February 2, 2008  
Condition of EUT : Engineering 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: 13CZG is the Remote Keyless Entry System (Receiver).

Frequency of Operation : 312.15MHz  
Oscillator Frequency : 38.70625MHz (Crystal)  
Local Oscillator Frequency : 309.65MHz (38.70625MHz x 8)  
Intermediate Frequency : 2.5MHz  
Type of receiver : Super-heterodyne  
Operating voltage(inner) : DC5V (Nominal supply voltage)  
Antenna type : Inverted L Antenna (Built-in)

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

The receiving antenna (of this EUT) is installed inside the EUT and cannot be removed. Therefore, this EUT complies with the requirement in section 15.111(b).

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

#### **3.1 Test specification**

Test Specification : FCC Part 15 Subpart B 2008 final revised on January 30, 2008  
 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	N/A	N/A*1)
Radiated emission	FCC: ANSI C63.4: 2003 8. Radiated emission measurements ----- IC: RSS-Gen 4.10	Receiver	N/A	21.7dB 115.331MHz Vertical	Complied

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

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

#### **3.3 Additions or deviations to standards**

No addition, deviation, nor exclusion has been made from standards.

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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	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	4.7dB	4.4dB	3.2dB	3.7dB	4.4dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.3dB	3.9dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	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

UL Japan, Inc. Head Office EMC Lab. \*NVLAP Lab. code: 200572-0  
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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	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	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	IC4247-4	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

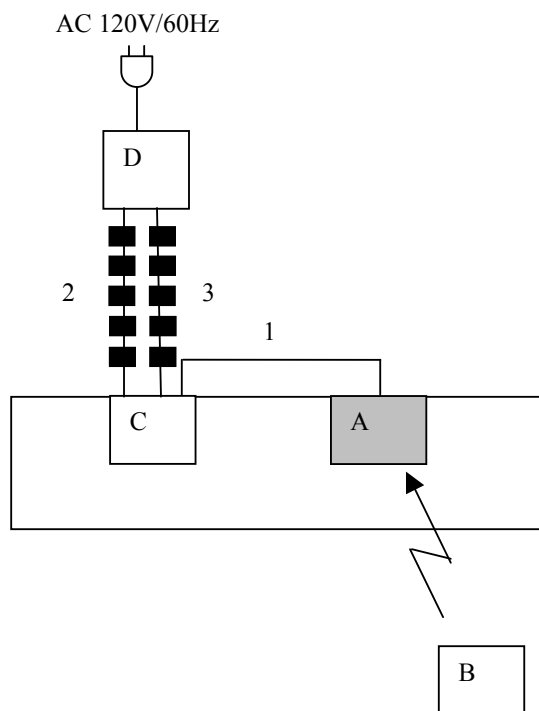
### 4.1 Operating modes

The mode is used : Receiving (312.15MHz).  
\* Remote Keyless Entry System (Transmitter) was operated manually by a test engineer and the test was performed with the EUT receiving 312.15MHz.

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

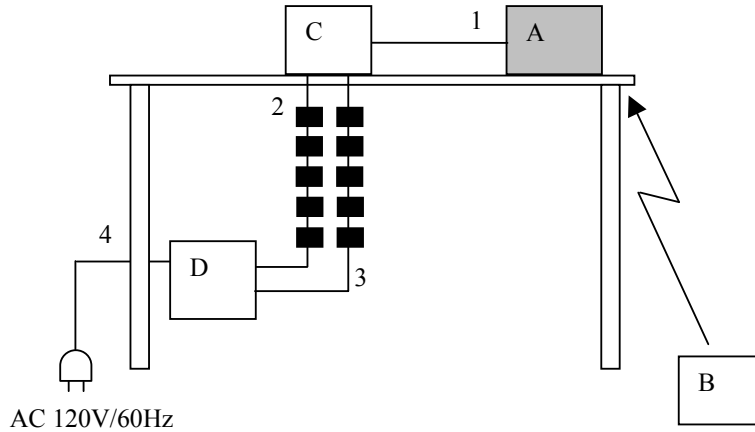
### 4.2 Configuration and peripherals

< Top view >



■ : Standard Ferrite Core (EUT noise were not influenced by these ferrite cores)

< Side view >



■ : Standard Ferrite Core (EUT noise were not influenced by these ferrite cores)

\*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	Remote Keyless Entry System (Receiver)	13CZG	1	DENSO	EUT
B	Remote Keyless Entry System (Transmitter)	-	-	DENSO	-
C	Checker Bench	-	-	DENSO	-
D	DC Power Supply	PW18-1.3AT	08016530	KENWOOD TMI	-

**List of cables used**

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal Cable	2.0	Shielded	Shielded	-
2	DC cable	1.0	Unshielded	Unshielded	With 5 Standard Ferrite Cores
3	DC cable	1.0	Unshielded	Unshielded	With 5 Standard Ferrite Cores
4	AC cable	2.0	Unshielded	Unshielded	-



## **SECTION 5: Radiated Emission**

### **5.1 Operating environment**

Test place : No.1 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 80cm above the conducting ground plane. The EUT was set on the edge 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.

A drawing of the set up is shown in the photos of APPENDIX 1.

### **5.3 Test conditions**

Frequency range : 30MHz – 300MHz (Biconical antenna) / 300MHz – 1000MHz (Logperiodic antenna)  
1G-2GHz (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 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 (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

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

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

- The carrier level and 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: February 5, 2008

Test engineer: Kenichi Adachi

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