



Test report No. : 31IE0067-HO-01-A-R1  
Page : 1 of 12  
Issued date : June 28, 2011  
Revised date : September 6, 2011  
FCC ID : HYQDECS002

## EMI TEST REPORT

Test Report No. : 31IE0067-HO-01-A-R1

**Applicant** : DENSO CORPORATION  
**Type of Equipment** : Electrostatic Capacity sensor  
**Model No.** : DECS002  
**Test standard** : FCC Part 18 : 2002  
**FCC ID** : HYQDECS002  
**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 report is a revised version of 31IE0067-HO-01-A. 31IE0067-HO-01-A is replaced with this report.

**Date of test:**

June 14, 2011

**Representative test engineer:**

Hironobu Ohnishi  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by:**

Shinya Watanabe  
Leader of WiSE Japan,  
UL Verification Service

**UL Japan, Inc.**

**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: Customer information**

Company Name : DENSO CORPORATION  
Address : 1-1, Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan  
Telephone Number : +81-566-25-5947  
Facsimile Number : +81-566-25-4546  
Contact Person : HIROYUKI SUDO

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

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

Type of Equipment : Electrostatic Capacity sensor  
Model No. : DECS002  
Serial No. : Refer to Section 4, Clause 4.2  
Rating : DC12V  
Receipt Date of Sample : June 9, 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**

Model No: DECS002 is the Electrostatic Capacity sensor.

Feature of EUT : This sensor is installed in the vehicle seat and used for detecting the object on the seat.  
Clock frequency in the system : CPU: 16MHz  
Custom IC: 4MHz  
Electrostatic Sensor: 83.33kHz  
Maximum amplitude voltage : 1.0Vp-p (+/-0.1V) AC (Offset 2.5V +/-0.15V DC)

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

### **3.1 Test specification**

Test Specification : FCC Part 18 2002  
Title : FCC 47CFR Part18 Industrial, scientific, and medical equipment

### **3.2 Procedures and results**

Item	Test Procedure & Limits	Deviation	Worst margin	Result
Radiated emission	Section 18.305 FCC/OST MP-5	N/A	6.6dB 0.16666MHz, Peak	Complied
Conducted emission	Section 18.307 FCC/OST MP-5	N/A	N/A *1)	N/A
*Note: UL Japan, Inc.'s EMI Work Procedure 13-EM-W0420.				
*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 (semi-anechoic chamber)	Radiated emission (10m*)(±dB)		
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz
No.1	2.7dB	4.8dB	5.0dB
No.2	-	-	-
No.3	-	-	-
No.4	-	-	-

\*10m = Measurement distance

#### Radiated emission test(10m)

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  
 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	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

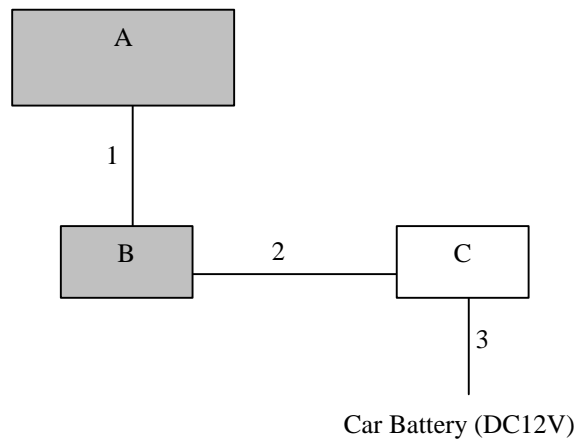
Refer to APPENDIX 1 to 3.

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

### **4.1 Operating mode(s)**

The mode is used : Detecting Mode

### **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	Electrostatic Capacity sensor	DECS002	5-184900-096	DENSO CORPORATION	EUT
B	ECU	DECS002	5-252200-060	DENSO CORPORATION	EUT
C	Test bench	ADE-296	5-252260-010	DENSO CORPORATION	-

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

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal Cable	0.2	Unshielded	Unshielded	-
2	Signal Cable	1.45	Unshielded	Unshielded	-
3	DC Cable	0.5	Unshielded	Unshielded	-

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## **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 carpet for insulation above the reference ground plane.  
Photographs of the set up are shown in Appendix 1.

### **5.3 Test conditions**

Frequency range : 9kHz - 30MHz (Loop Antenna)  
Test distance : 10m  
EUT position : Floor standing  
EUT operation mode : See Clause 4.1

### **5.4 Test procedure**

The height of antenna was fixed in 2m.  
EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.  
The measurements were performed in 0deg., 45deg., 90deg., 135 deg. and Horizontal with the Test Receiver.  
\*Refer to Figure 1 about Direction of the Loop Antenna.

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

Frequency	9kHz - 150kHz	150kHz - 30MHz
Instrument used	Test Receiver	
IF Bandwidth	PK: 200Hz	PK: 9kHz

The limit was converted by the following formula:  
$$[\text{Limit at 10m}] = [\text{Limit at 300m}] - 20 \times \log (10[\text{m}] / 300[\text{m}])$$
  
\*Refer to Part 18 Section 305 Notes 2

### **5.5 Test result**

Summary of the test results: Pass

Date: June 14, 2011

Test engineer: Tsubasa Takayama

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**Head Office EMC Lab.**

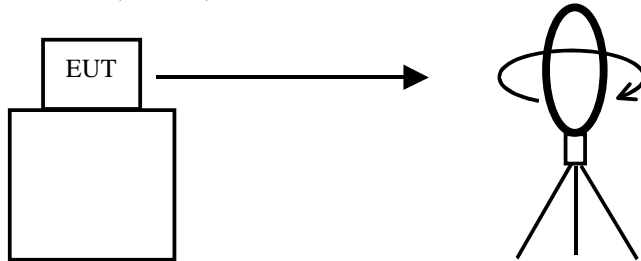
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Telephone : +81 596 24 8116

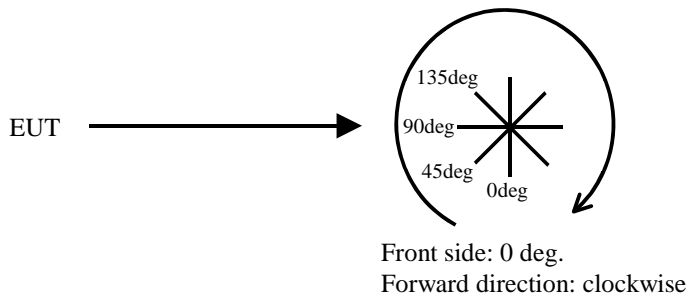
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**Figure 1: Direction of the Loop Antenna**

*Side View (Vertical)*



.....  
*Top View (Vertical)*



.....  
*Top View (Horizontal)*

