



EMI TEST REPORT

Test Report No. : 27CE0103-HO-D-2

Applicant : **DENSO CORPORATION**
Type of Equipment : **Remote Keyless Entry System (Receiver)**
Model No. : **13CZA**
FCC ID : **HYQ13CZA**
Test standard : **FCC Part 15 Subpart B 2006**
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 the above regulation.
4. The test results in this report are traceable to the national or international standards.

Date of test:

November 11, 2006

Tested by:


Mitsuru Fujimura
EMC Services

Approved by :


Naoki Sakamoto
Group Leader of
EMC Services



NVLAP LAB CODE: 200572-0

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://ulapex.jp/emc/nvlap.htm>

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

MF060b(14.06.06)

CONTENTS	PAGE
SECTION 1: Client information.....	3
SECTION 2: Equipment under test (E.U.T.)	3
SECTION 3: Test specification, procedures & results	4
SECTION 4: Operation of E.U.T. during testing.....	6
SECTION 5: Radiated Emission	7
APPENDIX 1: Photographs of test setup.....	8
Radiated Emission	8
APPENDIX 2: Data of EMI test	10
Radiated Emission (below 1GHz).....	10
APPENDIX 3: Test instruments	12

SECTION 1: Client 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.	:	13CZA
Serial No.	:	No.2
Rating	:	DC5.0V
Country of Manufacture	:	Japan
Receipt Date of Sample	:	October 27, 2006
Condition of EUT	:	Production model
Modification of EUT	:	No modification by the test lab.

2.2 Product Description

Model No: 13CZA (referred to as the EUT in this report) is the Remote Keyless Entry System (Receiver).

Equipment Type	:	Receiver
Receiving frequency	:	312.15MHz
Local oscillator frequency	:	$37.68125\text{MHz} * 8 = 301.45\text{MHz}$
Intermediate Frequency	:	10.7MHz
ITU code	:	A1D
Type of Receiving system	:	Super Heterodyne
Antenna Type	:	Built-in type (Fixed)

*** FCC 15.111 (b)**

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

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B 2006
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin *0)	Result
Conducted emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Except for Class A	N/A	N/A	N/A *1)
Radiated emission	ANSI C63.4: 2003 8. Radiated emission measurements	Except for Class A	N/A	23.4dB 301.463MHz, 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 was not performed since the EUT does not have AC power port.

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

3.3 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications, FCC Part15 Subpart B 2006.

3.4 Uncertainty

Radiated Emission

The measurement uncertainty (with a 95% confidence level) for this test using Loop antenna is $\pm 4.41\text{dB}(3\text{m})$.

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

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

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.

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 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	2.0 x 2.0 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 5.4 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	-

* 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, Data of EMI, and Test instruments

Refer to APPENDIX 1 to 3.

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

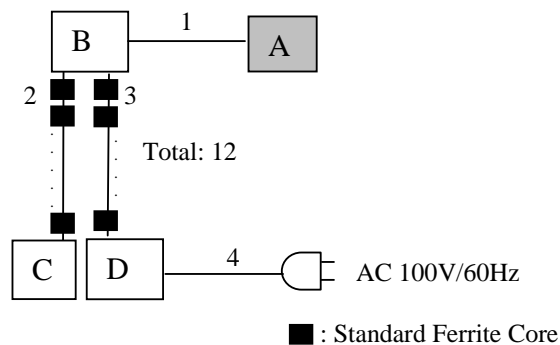
MF060b(14.06.06)

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

4.1 Operating modes

The mode is used : 312.15MHz Receiving 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	Remote Keyless Entry System (Receiver)	13CZA	No.2	DENSO	EUT
B	Checker box	-	-	DENSO	-
C	Car Battery	40B19L	-	YUASA	-
D	DC power supply	PW18-1.3AT	08016530	KENWOOD TMI	-

List of cables used

No	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC / Signal Cable	2.5	Unshielded	Unshielded	-
2	DC Cable	2.0	Unshielded	Unshielded	With twelve ferrite cores
3	DC Cable	2.0	Unshielded	Unshielded	With twelve ferrite cores
4	AC Cable	2.3	Unshielded	Unshielded	-

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 wooden table of nominal size, 1.0m by 1.5m, 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)
1000-2000MHz (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 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: November 11, 2006

Test engineer: Mitsuru Fujimura

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

MF060b(14.06.06)