



RADIO TEST REPORT

Test Report No. : 29DE0063-HO-01-A-R1

Applicant : DENSO CORPORATION
Type of Equipment : Electronic Key
Model No. : 14ADR
Test regulation : FCC Part 15 Subpart C:2008
Section 15.231
FCC ID : HYQ14ADR
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.
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6. Original test report number of this report is 29DE0063-HO-01-A.

Date of test:

November 28, 2008

Tested by:

Kazufumi Nakai
EMC Services

Approved by :

Makoto Kosaka
EMC Services



NVLAP LAB CODE: 200572-0

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SECTION 1: Customer information

Company Name : DENSO CORPORATION
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Contact Person : Jun Namizaki

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

2.1 Identification of E.U.T.

Type of Equipment : Electronic Key
Model No. : 14ADR
Serial No. : 001: Used for Radiated Emission and -20dB Bandwidth
and 99% Occupied Bandwidth tests
002: Used for Automatically deactivate and Duty cycle tests
Rating : DC 3.0V
Receipt Date of Sample : November 28, 2008
Country of Mass-production : Japan and United States
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: 14ADR (referred to as the EUT in this report) is the Electronic Key.

Equipment Type : Transmitter
Frequency of Operation : 314.35MHz
Oscillator frequency : 314.35MHz SAW resonator
Type of modulation : FSK
Power Supply : Norminal supply voltage: DC 3.0V (One lithium battery)
Antenna Type : Built-in type (Fixed)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2008, final revised on May 19, 2008
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

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

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Section 15.231(a)(1) <IC> RSS-210 A1.1.1	N/A	N/A	Complied
2	Electric Field Strength of Fundamental Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.8	<FCC> Section 15.231(b) <IC> RSS-210 A1.1.2	N/A	5.6dB, 314.35MHz, Horizontal, QP	Complied
3	Electric Field Strength of Spurious Emission	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> RSS-Gen 4.9	<FCC> Section 15.205 Section 15.209 Section 15.231(b) <IC> RSS-210 A1.1.2, 2.6, 2.7	N/A	15.7dB, 1571.75MHz, Vertical, Peak with Duty factor	Complied
4	-20dB Bandwidth	<FCC> ANSI C63.4:2003 13. Measurement of intentional radiators <IC> -	<FCC> Section 15.231(c) <IC> Reference data	N/A	N/A	Complied
5	Conducted emission	<FCC> ANSI C63.4:2003 7. AC powerline conducted emission measurements <IC> RSS-Gen 7.2.2	<FCC> Section 15.207 <IC> RSS-Gen 7.2.2	-	N/A*1)	N/A

Note: UL Japan, Inc.'s EMI Work procedures No. 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 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	<IC> RSS-Gen 4.6.1	<IC> RSS-210 A1.1.3	Conducted	N/A	N/A	Complied

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3.4 Uncertainty

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 : 1) Transmitting mode
 2) Normal use mode
 (As for the pulse train of sample used in this test, please refer to “Theory of Operation”
 in application document.)

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

4.2 Configuration and peripherals

A

* Test data was taken under worse case conditions.

Description of EUT

No	Item	Model number	Serial number	Manufacturer	Remarks
A	Electronic Key	14ADR	001 *1) 002 *2)	DENSO CORPORATION	EUT

*1) Used for Radiated Emission and -20dB Bandwidth and 99% Occupied Bandwidth tests

*2) Used for Automatically deactivate and Duty cycle tests

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SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious 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-3200MHz
Test distance : 3m
EUT position : Top of Polyurethane table
EUT operation mode : See Clause 4.1

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on No.3 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 intensity.
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.

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

- The carrier level and noise levels were measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies was measured.
This EUT has two modes which mechanical key is inserted or not. The worst case was confirmed with and without mechanical key, as a result, the test without mechanical key was the worst case. Therefore the test without mechanical key was performed only.

5.5 Results

Summary of the test results: Pass