




RADIO TEST REPORT

Test Report No.: 27FE0254-YK-A

Applicant : Alps Electric Co., Ltd.
Type of Equipment : Passive Entry System (Control Unit)
Model No. : TWD1J679
FCC ID : CWTWDJ679
Test Standard : FCC Part15 Subpart C: 2006
Test Result : Complied

1. This test report shall not be reproduced except in full, 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 test report are traceable to the national or international standards.

Date of test: February 13, 2007

Tested by: 
Toyokazu Imamura


Approved by: 
Osamu Watatani
Manager of Yamakita EMC Lab.

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1 Applicant Information

Company Name : Alps Electric Co., Ltd.
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2 Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Passive Entry System (Control Unit)
Model No. : TWD1J679
Serial No. : 933756
Rating : DC12V (Car Battery)
Country of Manufacture : Japan
Receipt Date of Sample : February 9, 2007
Condition of EUT : Production model
Modification of EUT : No modification by the test lab.

2.2 Product Description

Model: TWD1J679 (referred to as the EUT in this report) is a Control Unit of Passive Entry System. The Passive Entry System is a system which locks, unlocks and can start engine only with the intelligent-key of the vehicle.

Equipment type : Transmitter
Frequency of operation : 125kHz
Clock frequency : 16MHz (Main), 32.768kHz (Sub)
Type of modulation : AM
Antenna type : External bar
Antenna connector type : None
ITU code : A1D
Operation temperature range : -30 to +80 deg.C.

*FCC Part15.31 (e)

The power supply of the EUT is transformed to DC5.0V and provides stable voltage, DC5.0V constantly to Radio part. Therefore, the EUT complies with the power supply regulation.

*FCC Part15.203

It is impossible for users to replace the antenna because the antenna is a set with EUT and installed outside of the EUT inside the vehicle. Therefore, the EUT complies with the antenna requirement.

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3 Test Specification, Procedures and Results

3.1 Test specification

Test specification : FCC Part15 Subpart C: 2006
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.209: Radiated emission limits, general requirements

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4: 2003 7. AC powerline conducted emission measurements	Section 15.207(a)	-	N/A *1	-	N/A
Electric Field Strength of Fundamental Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.209	Radiated	N/A	12.1dB (Horizontal, AV)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4: 2003 13. Measurement of intentional radiators	Section 15.205 & 209	Radiated	N/A	6.1dB (32.37MHz, Vertical, QP)	Complied
-26dB Bandwidth	ANSI C63.4: 2003 13. Measurement of intentional radiators	-	Radiated	N/A	-	Complied

*1) The test is not applicable since the EUT has no AC mains.

Note: UL Apex's EMI Work Procedures No.QPM05.

* No addition, exclusion nor deviation has been made from the standard.

3.3 Uncertainty

Radiated emission test

The measurement uncertainty (with 95% confidence level) for this test using Loop antenna is ± 2.3 dB.
 The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.
 The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ± 4.3 dB.
 The data listed in this test report has enough margin, more than site margin.

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3.4 Test Location

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Facsimile number : +81 465 77 2112
NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).
IC Registration No. : IC3489A

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).
IC Registration No. : IC3489A-2

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).
IC Registration No. : IC3489A-B

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 Semi-anechoic chamber	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

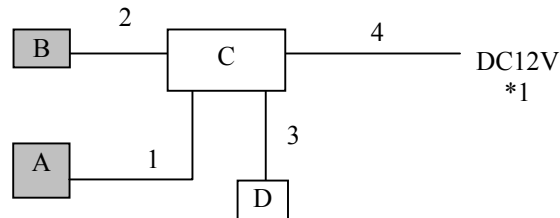
4 System Test Configuration

4.1 Justification

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

Test mode: Transmitting (125kHz)

4.2 Configuration of Tested System



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	Passive Entry System (Control Unit)	TWD1J679	933756	Alps Electric Co., Ltd.	CWTWDJ679 (EUT)
B	LF Antenna	-	ANT-4	Alps Electric Co., Ltd.	(EUT)
C	Checker Box	-	Checker box-4	Alps Electric Co., Ltd.	-
D	Checker CW	-	-	Alps Electric Co., Ltd.	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal & DC power cable	0.9	Shielded	Unshielded	-
2	Antenna cable	1.8	Unshielded	Unshielded	-
3	Cable for Checker CW	0.2	Unshielded	Unshielded	-
4	DC power cable	1.0	Unshielded	Unshielded	-

5 Radiated Emissions (Fundamental & Spurious)

5.1 Operating environment

The test was carried out in No.1 anechoic chamber.

Temperature : See test data
 Humidity : See test data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 9kHz - 1GHz
 EUT position : Table top
 EUT operation mode : Transmitting

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

Frequency: From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for each antenna angle 0deg., 45deg. and 90deg.

Frequency: From 30MHz to 1GHz at distance 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.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	9kHz - 90kHz and 110kHz - 150kHz	90kHz - 110kHz	150kHz - 490kHz	490kHz - 30MHz	30MHz - 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz
Measuring antenna	Loop antenna			Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	

The equipment and its antenna were previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 11. With the position, the noise levels of all the frequencies were measured.

	EUT	EUT's antenna
Horizontal	X	X
Vertical	X	X

5.5 Results

Summary of the test results : Pass

Date : February 13, 2007

Test engineer : Toyokazu Imamura

UL Apex Co., Ltd.

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6 Bandwidth

6.1 Operating environment

The test was carried out in No.1 anechoic chamber.

6.2 Test procedure

The bandwidth was measured with a spectrum analyzer and an antenna which is placed by the EUT.

6.3 Results

Summary of the test results: Pass

Date : February 13, 2007

Test engineer : Toyokazu Imamura

APPENDIX 1: Photographs of test setup

Page 10 : Radiated emission
Page 11 : Pre-check of the worst position

APPENDIX 2: Test Data

Page 12 - 14 : Radiated Emission
12-13 : Fundamental & Harmonics
14 : Other
Page 15 - 16 : -26dB Bandwidth and Occupied Bandwidth

APPENDIX 3: Test instruments

Page 17 : Test instruments