



EMI TEST REPORT

Test Report No. : 28LE0167-HO-01

Applicant : Alps Electric Co., Ltd.

Type of Equipment : TPMS/Keyless Tuner

Model No. : TWC1G124

FCC ID : CWTWC1G124

Test regulation : FCC Part 15 Subpart B 2008

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 the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test:

September 1, 2008

Tested by:

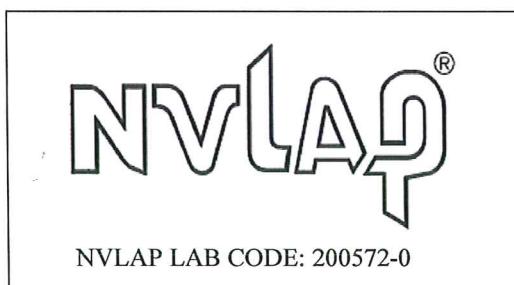
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<http://uljapan.co.jp/emc/nvlap.htm>

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SECTION 1: Customer information

Company Name : Alps Electric Co., Ltd.
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Facsimile Number : +81-229-22-3755
Contact Person : Tomosuke Takata

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

2.1 Identification of E.U.T.

Type of Equipment : TPMS/Keyless Tuner
Model No. : TWC1G124
Serial No. : 08082201
Receipt Date of Sample : September 1, 2008
Country of Mass-production : JAPAN
Rating : DC5.0V
Condition of EUT : Production model
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No: TWC1G124 (referred to as the EUT in this report) is the TPMS/Keyless Tuner.

Feature of EUT: This tuner receives RF signal from keyless remote or tire pressure monitor transmitter via RF antenna, and outputs demodulated digital data to the controller.

Clock frequency(ies) in the system : 52.90MHz(Oscillator circuit)

Type of Receiver : Super heterodyne
Frequency of operation : 433.92MHz
Local Oscillator circuit : 423.22MHz (52.90MHz x 8)
Intermediate frequency : 10.7MHz
Antenna Type : Internal antenna (Monopole)
Antenna Connector Type : N/A
Method of Frequency Generation : Crystal

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 May 19, 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	18.8dB 867.840MHz, Vertical, QP	Complied

*Note: UL Japan, Inc's EMI Work Procedure QPM05.

*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 addition or exclusion.

3.3 Additions or deviations to standards

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

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	4.4dB	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

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	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.

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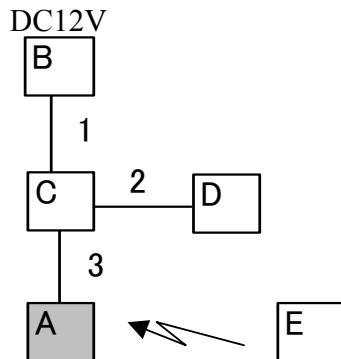
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SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes

The mode is used : Receiving mode (433.92MHz)
 * Transmitter was operated manually by a test engineer and the test was performed with the EUT receiving 433.92MHz.

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	TPMS/Keyless Tuner	TWC1G124	08082201	Alps Electric Co., Ltd.	EUT
B	Car Battery	-	-	YUASA	-
C	CHECKER	-	-	Alps Electric Co., Ltd.	-
D	BCM	284B2ED70A	061018-2/5	Calsonic Kansei	-
E	Transmitter	TWB1U752	071011-TX	Alps Electric Co., Ltd.	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC power cable	1.0	Unshielded	Unshielded	-
2	Cable for BCM	0.45	Unshielded	Unshielded	-
3	Cable for TUNER	0.85	Unshielded	Unshielded	-

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.2 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. Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)
1000MHz -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. 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 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: September 1, 2008

Test engineer: Satofumi Matsuyama

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