EMI TEST REPORT

Test Report No. : 28EE0011-HO-01-A

Applicant	:	**Alps Electric Co., Ltd.**
Type of Equipment	:	**TPMS Tuner**
Model No.	:	**TWC1U280**
FCC ID	:	**CWTWC1U280**
Test standard	:	**FCC Part 15 Subpart B 2007**
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.

Date of test:

January 8, 2008

Tested by:

T. Hatakeda

Takahiro Hatakeda
EMC Services

Approved by :

M. Fujimura

Mitsuru Fujimura
Assistant Manager of
EMC Services

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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.
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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.
Address	:	6-3-36 Nakazato, Furukawa, Osaki-city, Miyagi-pref.,Japan
Telephone Number	:	+81-229-23-5111
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 Tuner
Model No.	:	TWC1U280
Serial No.	:	071220-1
Country of Manufacture	:	JAPAN
Power Supply	:	DC10V
Receipt Date of Sample	:	December 28, 2007
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: TWC1U280 is the TPMS Tuner.

Feature of EUT:

Clock frequency(ies) in the system	:	40.71MHz(Oscillator circuit)
Type of Receiver	:	Super hetrodyne
Frequency of Operation	:	315MHz
Intermediate Frequency	:	10.7MHz
Antenna Type	:	Internal antenna(Pattern Antenna)
Method of Frequency Generation	:	Crystal
Operating temperature range	:	-30 to +70 deg.C.

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).

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B 2007
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 *1)	N/A
Radiated emission	**FCC:** ANSI C63.4: 2003 8. Radiated emission measurements **IC:** RSS-Gen 4.10	receiver	N/A	9.4dB 81.420MHz Vertical	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 additions or exclusions.

3.3 Additions or deviations to standards

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

3.4 Uncertainty

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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	±4.7dB	±4.4dB	±3.2dB	±3.7dB	±4.4dB	±5.9dB	±6.1dB
No.2 semi-anechoic chamber	±3.7dB	-	-	-	±3.2dB	±4.3dB	±3.9dB	±5.9dB	±6.1dB
No.3 semi-anechoic chamber	±3.7dB	-	-	-	±3.2dB	±4.2dB	±4.4dB	±5.9dB	±6.1dB
No.4 semi-anechoic chamber	±3.7dB	-	-	-	±3.2dB	±4.2dB	±4.4dB	±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.

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	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	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	IC4247-4	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	N/A	-
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

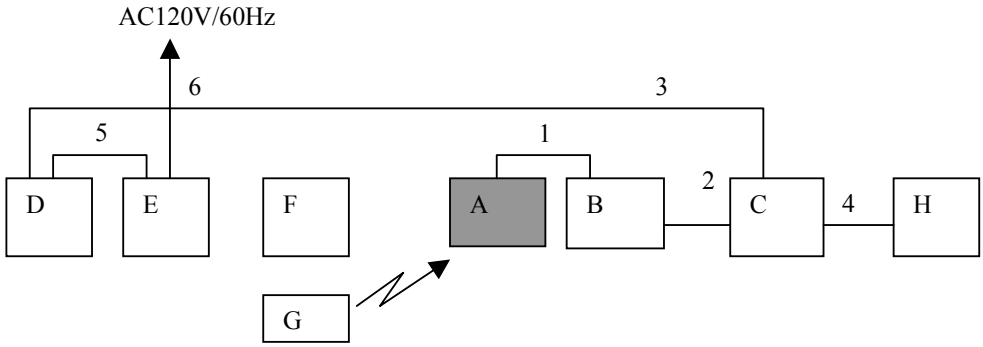
Refer to APPENDIX 1 to 3 .

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

4.1 Operating modes

The mode is used : Constant power supply mode(IGN=ON)
10V is supplied to tuner via the jig(ECU) when Battery voltage is 12V.

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	Manufactur	Remark
A	TPMS Tuner	TWC1U280	071220-1	ALPS	EUT
B	ECU	TFWH2U002A	704DB29A	ALPS	-
C	RS232C Interface Unit	-	-	ALPS	-
D	Note PC	T30	97-99D4L	IBM	-
E	AC Adapter	02K6750	11S02K6750Z1Z2UP 29A0TJ	IBM	-
F	Transponder	VT10	-	ATEQ	-
G	Sensor (Transmitter)	PA66-GF33	07607114917F7808	PACIFIC	-
H	Car Battery	40B19L	A030402	YUASA	-

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	Signal Cable	1.5	Unshielded	Unshielded
2	Signal Cable	0.8	Unshielded	Unshielded
3	RS232C Cable	2.0	Shielded	Shielded
4	DC Cable	1.3	Unshielded	Unshielded
5	DC Cable	1.8	Unshielded	Unshielded
6	AC Cable	1.0	Unshielded	Unshielded

SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.4 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 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 X-axis position on behalf of all positions because there is no difference .

5.5 Test result

Summary of the test results: Pass

Date: January 8, 2008 Test engineer: Takahiro Hatakeda