

EMI TEST REPORT

Test Report No. : 26CE0012-HO-1

Applicant	:	Alps Electric Co., Ltd.
Type of Equipment	:	TPMS / Keyless Tuner
Model No.	:	TWC1U241
Test standard	:	FCC Part15 Subpart B, Section 15.109: 2005
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 above regulation. We hereby certify that the data contain a true representation of the EMC profile.

4. The test results in this test report are traceable to the national or international standards.

Date of test:

October 25, 2005

Tested by:

Go Ishiwata

Approved by:

Osamu Watatani Site Manager of Yamakita EMC Lab.

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SECTION 1: Client information

Company Name	:	Alps Electric Co., Ltd.	
Brand Name	:	ALPS	
Address	:	6-3-36 Nakazato, Furukawa-shi, Miyagi-ken, 989-6181 JAPA	۸N
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 / Keyless Tuner
Model Number	:	TWC1U241
Serial Number	:	05102101
Rating	:	DC5V
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Country of Manufacture	:	Mexico
Receipt Date of Sample	:	October 24, 2005

2.2 Product Description

Model: TWC1U241 (referred to as the EUT in this report) is a TPMS / Keyless Tuner. The clock frequency used in EUT: 40.71MHz (Oscillator circuit)

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

Type of receiver	:	Super Heterodyne
Receiving Frequency	:	315MHz
Operating temperature range	:	-40 to - 80 deg.C.

SECTION 3: Test specification, procedures & results

3.1 Test specification

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

3.2 Procedures & Results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted	ANSI C63.4: 2003	CISPR Pub.22	N/A	N/A	N/A
emission	7. AC powerline conducted emission		*1		
	measurements				
Radiated	ANSI C63.4: 2003	FCC15.109 (a)	N/A	14.2dB	Complied
emission	8. Radiated emission measurements			(128.69MHz, Horizontal)	_
Antenna	ANSI C63.4: 2003	FCC15.111 (a)	N/A	N/A	N/A
terminal	Annex G.5 Antenna-conducted power		*2		
voltage	measurement for receivers				
Note: UL Apex's EMI Work Procedures No. QPM05					
*1) The test is not applicable since the EUT has no AC mains.					

*2) The test is not applicable since the EUT has no antenna ports.

3.3 Additions to standards

No addition, deviation or exclusion has been made from standards.

3.4 Confirmation

UL Apex Co., Ltd. hereby confirms the E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart B.

3.5 Uncertainty

Radiated emission

The measurement uncertainty (with 95% confidence level) for this test using Biconical antenna is ± 4.8 dB. The measurement uncertainty (with 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.

The data listed in this test report has enough margin, more than site margin.

3.6 Test Location

UL Apex Co., Ltd. Yamakita EMC Lab.

907, Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124JAPANTelephone number:+81 465 77 1011Facsimile number:+81 465 77 2112NVLAP Lab. code:200441-0

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

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 EMS lab.	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5	(Semi-anechoic chamber)	
No.3 shielded room	4.0 x 5.0 x 2.7		

3.7 Test Setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

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

4.1 **Operating mode**

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Operation: Constant power supply mode 5V of power is supplied from BCM to the EUT constantly.

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

4.2 Configuration of Tested System



*Cabling was taken into consideration and test data was taken under worse case conditions.

No.	Item	Model number	Serial number	Manufacturer	Remarks (FCC ID)
Α	TPMS / Keyless Tuner	TWC1U241	05102101	ALPS	EUT (CWTWC1U241)
В	DC Power Supply	PAN35-10A	DE001677	Kikusui	-
С	Checker	-	-	ALPS	-
D	BCM	284B1CM32A	050706-2/3	Calsonic Kansei	-

Description of EUT and support equipment

List of cables used

No.	Name	Length (m)	Shield
1	DC power cable	1.6	Unshielded
2	Cable for BCM	0.45	Unshielded
3	Cable for Tuner	0.55	Unshielded

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SECTION 5: Radiated emission

5.1 **Operating environment**

The test was carried out in No.2 open test site.

Temperature	:	See test data
Humidity	:	See test data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. 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	:	30 - 1000MHz
Test distance	:	3m
EUT position	:	Table top
EUT operation mode	:	Constant power supply

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open site with a ground plane and at a distance of 3m. Pre check measurements were performed in a screened room with a search coil at 30-1000MHz to distinguish disturbances of EUT from the ambient noise. Measurements were performed with quasi-peak detector. 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.

Detector Type	:	Quasi-Peak
IF Bandwidth	:	120kHz

5.5 Results

Summary of the test results: Pass

Date:	October 25, 2005	Tested by:	Go Ishiwata
	,		

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APPENDIX 1: Photographs of test setup

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APPENDIX 2: Data of EMI test

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APPENDIX 3: Test instruments

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Radiated emission



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DATA OF RADIATION TEST

UL Apex Co.,Ltd. Yamakita No.2 Open Test Site Report No. : 260E0012-H0 - 1

Appl Kind Mode Seri Powe Mode Rema Date Test Temp Humi Regu	icant of Equ I No. al No. r rks Distand erature dity lation	ipment ce	L	Alps TPMS TWC1 0510 DC12 Cons 10/2 3 m 18 °C 61 9 FCC	Electr /KEYLES U241 2101 V tant po 5/2005 C 6 Part15B	ic Co. S TUNN wer su	., Ltd. ER upply m 109(a)	ode En	gineer	: (ìo Ishiw	ata	
No.	FREQ. [MHz]	ANT TYPE	REAI HOR [dB]	DING VER µV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESI HOR [dB µ]	ULT VER V/m] [d	LIMITS BµV/m]	MAF HOR [c	RGIN VER HB]
1. 2. 3. 4. 5. 6.	40. 71 86. 38 128. 69 325. 70 651. 40 977. 10	BB BB BB BB BB BB	28. 3 24. 6 34. 7 24. 2 23. 6 20. 9	28. 4 29. 5 30. 8 22. 7 23. 2 20. 9	15. 0 8. 3 14. 2 15. 1 20. 0 24. 0	27.7 27.7 27.8 27.5 28.7 28.3	1.3 1.9 2.4 3.9 5.7 7.2	5.8 5.8 5.8 5.8 5.8 5.8 5.8 5.8	22. 7 12. 9 29. 3 21. 5 26. 4 29. 6	22. 8 17. 8 25. 4 20. 0 26. 0 29. 6	40. 0 40. 0 43. 5 46. 0 46. 0 54. 0	17.3 27.1 14.2 24.5 19.6 24.4	17. 2 22. 2 18. 1 26. 0 20. 0 24. 4

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

.

■ ANTENNA: KBA-02 (BBA9106) 30-299MHz/KLA-02 (USLP9143) 300-1000MHz ■ AMP: KAF-03 (8447D) ■ RECEIVER: KTR-01 (ESI40) ■ CABLE: KCC-20/21/22/23/29

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DATA OF RADIATION TEST

UL Apex Co.,Ltd. Yamakita No.2 Open Test Site Report No. : 26CE0012-H0 - 1

Applicant Kind of Equipment Model No. Serial No. Power Mode	Alps Electric Co., Ltd. TPMS/KEYLESS TUNER TWC1U241 05102101 DC12V Constant power supply mode		
Remarks Date Test Distance Temperature Humidity Regulation	10/25/2005 3 m 18 °C 61 % FCC Part15B §15.109(a)	Engineer	: Go Ishiwata



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APPENDIX 3

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date *
KAF-03	Pre Amplifier	Hewlett Packard	8447D	RE	2005/09/09 * 12
KAT6-03	Attenuator	INMET	18N-6dB	RE	2005/04/07 * 12
KBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/07/29 * 12
KCC-20/21/22 /23/29	Coaxial Cable	Fujikura/Suhner	8D-2W/12D-SFA/S0 4272B/S04272B	RE	2005/09/02 * 12
KLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/07/29 * 12
KOTS-02	Open Test Site	JSE	10m	RE	2005/08/07 * 12
KSA-02	Spectrum Analyzer	Advantest	R3265A	RE	2004/11/18 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2005/08/05 * 12
i	1				

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards. Test Item:

RE: Radiated emission