EMI TEST REPORT

Test Report No. : 25DE0287-HO-1

Applicant	:	**Alps Electric Co.,Ltd.**
Type of Equipment	:	**KEYLESS ENTRY UNIT (Receiver)**
Model No.	:	**TFWD1U718**
Test standard	:	**FCC Part 15 Subpart B: 2004 Class B**
FCC ID	:	**CWTWD1U718**
Test Result	:	**Complied**

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

Date of test : December 15, 2004

Tested by : K. Aoki
Keiichi Aoki
EMC Service

Approved by :
Naoki Sakamoto
Group Leader of EMC Service

UL Apex Co., Ltd.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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SECTION 1: Client information

Company Name	:	Alps Electric Co., Ltd.
Address	:	6-3-36 Nakazato, Furukawa-City Miyagi-pref., 989-6181 Japan
Telephone Number	:	+81-229-23-5111
Facsimile Number	:	+81-229-22-3755
Contact Person	:	Saori Mukai

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

2.1 Identification of E.U.T.

Type of Equipment	:	KEYLESS ENTRY UNIT (Receiver)
Model No.	:	TFWD1U718
Sample No.	:	1
Country of Manufacture	:	Japan
Rating	:	DC12V
Receipt Date of Sample	:	December 13, 2004
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No. TFWD1U718 is the KEYLESS ENTRY UNIT (Receiver).

Type of receiver	:	Super Heterodyne
Receiving Frequency	:	433.92MHz
Operating temperature range	:	-30 to +80 deg.C.

The receiving antenna (of this EUT) is installed on the KEYLESS ENTRY UNIT, which is unremovable. 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 Part15 Subpart B : 2004 Class B
FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin *0)	Result
Conducted emission	ANSI C63.4: 2003	Class B	N/A	N/A*1)	N/A
Radiated emission	ANSI C63.4: 2003	Class B	N/A	1.0dB 84.65MHz, QP Horizontal	Complied

*Note: UL Apex's EMI Work Procedure QPM05.
*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.
*1) The test is not applicable since the EUT does not have AC Mains.

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Uncertainty

Radiated Emission
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB(3m).
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB(3m).
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB(3m).
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.4 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

	Listed date (for FCC)	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	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

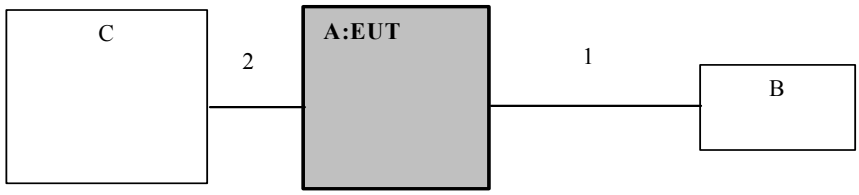
SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes

Test sequence is used : Receiving Mode
(Continuous Receiving of the conventional signals from the keyless transmitter.)
The signal of Keyless remote control is received.
*The test was performed with the same Receiving mode as the user would normally set.

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

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Sample number	Manufacturer	FCC ID
A	KEYLESS ENTRY UNIT (Receiver)	TFWD1U718	1	Alps Electric Co.,Ltd.	CWTWD1U718 (EUT)
B	Jig	-	-	Alps Electric Co.,Ltd.	-
C	Car Battery	40B19L	A030402	YUASA	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	Jig Cable	1.0	N	Polyvinyl Chloride
2	DC Cable	0.6	N	Polyvinyl Chloride

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 platform of nominal size, 1m by 1.5m, raised 80cm 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.
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)
: 1GHz – 2GHz (Horn antenna)
Test distance : 3m
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi anechoic chamber with a ground plane and at a distance of 3m.
Measurements were performed with a quasi-peak, Peak and Average detector.
The measuring antenna height was varied between 1 to 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.

The noise was measured at each position of all three axes X, Y and Z to compare the level, and the maximum noise level was recorded.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth or RBW & VBW	QP: 120 kHz	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz

5.5 Results

Summary of the test results: Pass

Date: December 15, 2004 Test engineer: Keiichi Aoki

APPENDIX 1: Photographs of test setup

This page has been submitted for a separate exhibit.

This page has been submitted for a separate exhibit.

APPENDIX 2:Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2004/04/12 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2004/02/03 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	RE	2004/02/18 * 12
MPA-06	Pre Amplifier	Hewlett Packard	8447D	RE	2004/08/29 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2004/02/06 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2004/02/24 * 12
MCC-04	Microwave Cable	Storm	421-011	RE	2004/01/06 * 12
MCC-29	Microwave Cable	Suhner	SUCOFLEX101	RE	2004/08/26 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2004/10/14 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2004/10/14 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2004/01/10 * 12

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

APPENDIX 3: Data of EMI test

Radiated Emission

DATA OF RADIATED EMISSION TEST

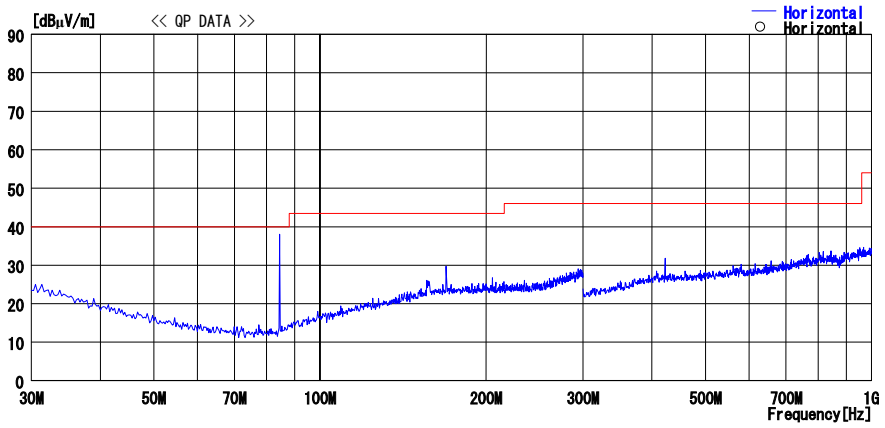
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber

Applicant : Alps Electric Co., Ltd.
Kind of EUT : KEYLESS ENTRY UNIT(Receiver)
Model No. : TFWD1U718
Serial No. : 1

Report No. : 25DE0287-HO
Power : DC 12.0V
Temp./Humi. : 24deg.C / 33%
Operator : Keiichi Aoki

Mode / Remarks : Receiving mode (433.92MHz)

LIMIT : FCC Part15 Class B(3m)/USA
Except for the data below : adequate margin data below the limits.



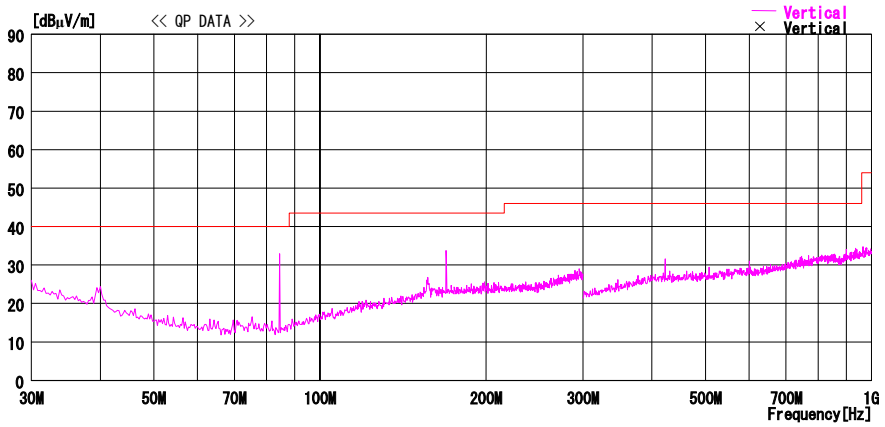


CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

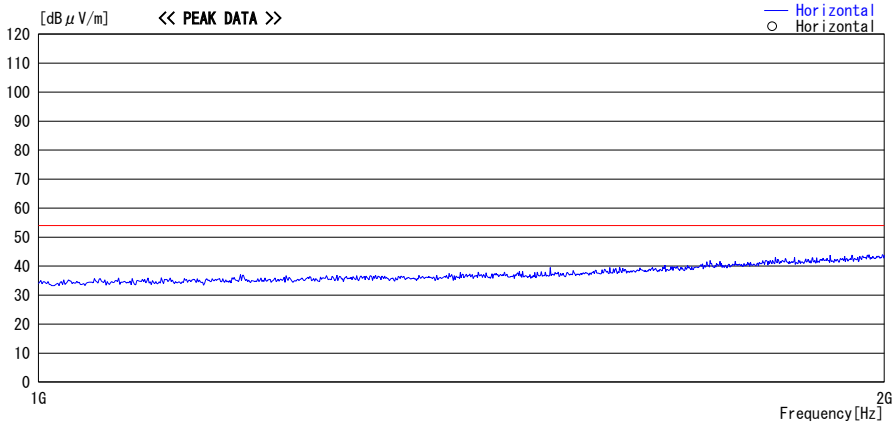
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber

Applicant	: Alps Electric Co., Ltd.	Report No.	: 25DE0287-HO
Kind of EUT	: KEYLESS ENTRY UNIT(Receiver)	Power	: DC 12.0V
Model No.	: TFWD1U718	Temp./Humi.	: 24deg.C / 33%
Serial No.	: 1	Operator	: Keiichi Aoki

Mode / Remarks : Receiving mode (433.92MHz)

LIMIT : FCC Part15 Class B(3m)/USA
Except for the data below : adequate margin data below the limits.



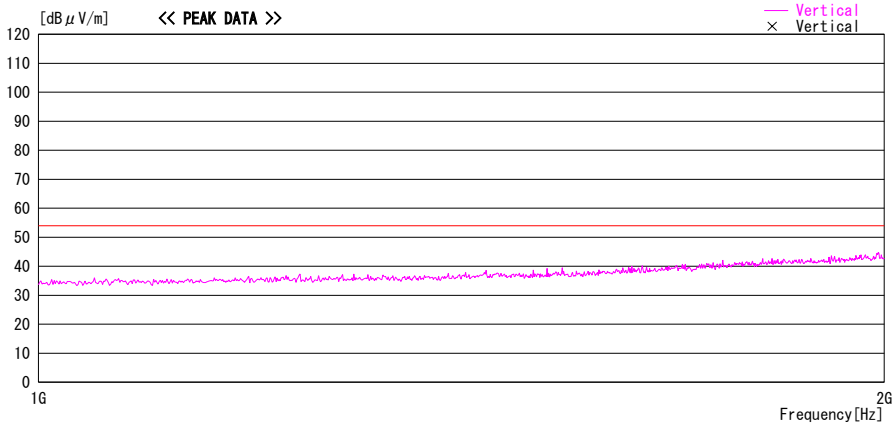


CHART:WITH FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

DATA OF SUPURIOUS EMISSIONS(30MHz to 2GHz)

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : Alps Electric Co., Ltd.
EQUIPMENT : KEYLESS ENTRY UNIT (Receiver)
MODEL : TFWD1U718
SAMPLE No. : 1
POWER : DC 12.0 V
MODE : Receiving mode (433.93MHz)

REPORT NO : 25DE0287-HO
REGULATION : FCC Part 15 Subpart B 15.109(a)
TEST DISTANCE : 3m
DATE : 2004/12/15
Temperature : 24deg.C
Humidity : 33%
ENGINEER : Keiichi Aoki

QP DETECT(T/R : IF BW 120kHz)

No.	FREQ	T/R READING		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER	QP	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
1	40.43	21.2	27.2	13.6	27.8	0.7	5.9	13.6	19.6	40.0	26.4	20.4
2	84.65	52.1	46.0	7.6	27.7	1.0	6.0	39.0	32.9	40.0	1.0	7.1
3	156.31	22.1	23.6	16.4	27.3	1.6	6.0	18.8	20.3	43.5	24.7	23.2
4	169.29	32.5	34.6	16.8	27.3	1.7	6.0	29.7	31.8	43.5	13.8	11.7
5	409.90	20.1	22.3	18.6	27.6	2.9	6.1	20.1	22.3	46.0	25.9	23.7
6	423.24	30.4	28.8	18.7	27.8	3.0	6.1	30.4	28.8	46.0	15.6	17.2

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER	PK	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
7	1414.74	44.9	45.1	23.8	36.6	5.5	0.0	37.6	37.8	74.0	36.4	36.2
8	1946.86	44.2	44.0	29.6	36.4	6.6	0.0	44.0	43.8	74.0	30.0	30.2

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		HOR	VER	AV	HOR	VER
	[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
7	1414.74	32.9	32.9	23.8	36.6	5.5	0.0	25.6	25.6	54.0	28.4	28.4
8	1946.86	31.8	31.7	29.6	36.4	6.6	0.0	31.6	31.5	54.0	22.4	22.5

Sample Calculation :
RESULT=Reading + ANT Factor - Amp Gain + Cabel Loss + ATT
*Except for the above table : All other spurious emissions were less than 20dB for the limit.
ATT. was not used for factor 0.0dB of the above table.