EMI TEST REPORT

Test Report No. : 26FE0028-HO-1

Applicant	:	**Alps Electric Co., Ltd.**
Type of Equipment	:	**Passive Entry System (Hand Unit)**
Model No.	:	**TWB1U729**
Test standard	:	**FCC Part 15 2005** **Subpart C Section 15.209, Section 15.231**
FCC ID	:	**CWTWBU729**
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:

February 9, 2006

Tested by:

Hiroka Umeyama
EMC Services

Approved by :

Naoki Sakamoto
Group Leader of EMC Services

UL Apex Co., Ltd.
Head Office EMC Lab.
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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	:	Katsuhiro Seino

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

2.1 Identification of E.U.T.

Type of Equipment	:	Passive Entry System (Hand Unit)
Model No.	:	TWB1U729
Serial No.	:	1
Country of Manufacture	:	Japan
Rating	:	DC3.0V
Receipt Date of Sample	:	February 1, 2006
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No: TWB1U729 is the Passive Entry System (Hand Unit).
The Passive Entry System is a system which locks, unlocks, and can start engine only with the intelligent-key of the vehicle.
The clock frequency of EUT is 8MHz (CPU), 315.04MHz (SAW Resonator).

Equipment Type	:	Transceiver
Frequency of operation	:	Tx: 315MHz
Type of modulation	:	FSK
Mode of operation	:	Simplex
Antenna Type	:	Tx: Internal/PCB Pattern (Loop)
Method of Frequency Generation	:	SAW RESONATOR
Operating voltage	:	DC3V (Button Battery CR2025)
Temperature of operation	:	-10 to +60 degree

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C 2005
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.231 Periodic operation in the band 40.6640.70MHz and above 70MHz

FCC 15.31 (e)
This EUT provides stable voltage(DC3.0V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
Type of Equipment and its antenna comply with this requirement since they are built in host device (TWB1U729). When they are put up for sale and they are used with a particular antenna connector for this EUT.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	Automatically Deactivate	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.231(a)(1)	N/A	-	Complied
2	Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.231(b)	N/A	6.3dB 315.00MHz Horizontal	Complied
3	Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.205 Section 15.209 Section 15.231(b)	N/A	4.5dB 630.00MHz Horizontal	Complied
4	-20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Reference data	N/A	-	-
5	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A*1)	N/A
Note: UL Apex's EMI Work procedures No. QPM05 and QPM15. *1) The test is not applicable since the EUT does not have AC Mains.						

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	-	Radiated	N/A	N/A	N/A

3.4 Uncertainty

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

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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Telephone : +81 596 24 8116
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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	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-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 measurement room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

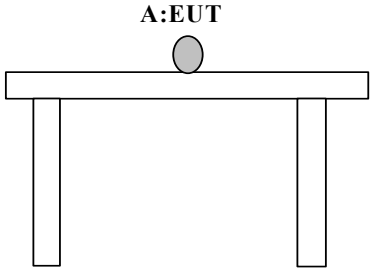
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : Transmitting mode

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

4.2 Configuration and peripherals



Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Passive Entry System (Hand Unit).	TWB1U729	1	Alps Electric Co., Ltd.	CWTWBU729

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

Test place : No.1 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of table size (1m x 0.5m x 0.8m) on 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 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-3200MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Transmitting

5.4 Test procedure

The measuring antenna height 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.

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 20dBc : RBW:100kHz/VBW:100kHz

- The carrier level and 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 Results

Summary of the test results: Pass

Date: February 9, 2006 Tested by: Hiroka Umeyama

APPENDIX 1: Photographs of test setup

Radiated emission(Worst case position)

Front

Rear

Worst Case Position (Horizontal : X-axis/ Vertical: Z-axis)

X-axis

Y-axis

Z-axis

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APPENDIX 2:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2005/11/14 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2005/11/10 * 12
MCC-17	Microwave Cable 1G-50GHz	Suhner	SUCOFLEX 101	RE	2006/02/02 * 12
MCC-15	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MPA-05	Pre Amplifier	TSJ	TSJ 1-26.5GHz PreAmp	RE	2005/07/08 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE	2004/11/25 * 24
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/ Agilent/TSJ	-	RE	2005/12/18 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2005/12/16 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12

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

Test Item:

RE: Carrier Frequency Separation, -20dB Bandwidth, Spurious Emission, Automatically deactivate

APPENDIX 3: Data of EMI test

Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 26FE0028-HO
EQUIPMENT	: Passive Entry System (Hand Unit)	REGULATION	: Fcc Part15 Subpart C 231(b) / 205
MODEL	: TWB1U729	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 02/09/2006
POWER	: DC3.0V	TEMPERATURE	: 18℃
Mode	: Continuous Transmitting	HUMIDITY	: 30%
Axis	: Hor.: X-axis , Ver.: Z-axis	ENGINEER	: Hiroka Umeyama

No.	FREQ	T/R READING HOR	T/R READING VER	ANT Factor	AMP GAIN	LOSS	Duty Factor	RESULT HOR	RESULT VER	Limit	MARGIN HOR	MARGIN VER	DETECTOR
	[MHz]	[dBuV/m]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]	
1	315.00	70.4	66.7	14.7	27.2	10.2	0.0	68.1	64.4	75.6	7.5	11.2	PK
1	315.00	71.6	68.0	14.7	27.2	10.2	0.0	69.3	65.7	75.6	6.3	9.9	QP
1	315.00	66.4	58.4	14.7	27.2	10.2	0.0	64.1	56.1	75.6	11.5	19.5	AV

(below 1GHz)

No.	FREQ	T/R READING HOR	T/R READING VER	ANT Factor	AMP GAIN	LOSS	Duty Factor	RESULT HOR	RESULT VER	Limit	MARGIN HOR	MARGIN VER	DETECTOR
	[MHz]	[dBuV/m]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]	
2	630.00	38.6	37.4	19.5	28.6	12.0	0.0	41.5	40.3	46.0	4.5	5.7	QP
3	945.00	32.8	32.1	22.3	28.2	13.4	0.0	40.3	39.6	46.0	5.7	6.4	QP

(above 1GHz)

No.	FREQ	T/R READING HOR	T/R READING VER	ANT Factor	AMP GAIN	LOSS	Duty Factor	RESULT HOR	RESULT VER	Limit	MARGIN HOR	MARGIN VER	DETECTOR
	[MHz]	[dBuV/m]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]	
4	1260.00	57.2	59.3	23.9	41.3	1.2	0.0	41.0	43.1	74.0	33.0	30.9	PK
5	1575.00	56.4	56.5	25.6	40.9	1.3	0.0	42.4	42.5	74.0	31.6	31.5	PK
6	1890.00	58.9	57.9	30.0	40.6	1.3	0.0	49.6	48.6	74.0	24.4	25.4	PK
7	2205.00	52.7	52.5	30.9	40.8	1.3	0.0	44.1	43.9	74.0	29.9	30.1	PK
8	2520.00	55.9	55.0	30.4	41.4	1.5	0.0	46.4	45.5	74.0	27.6	28.5	PK
9	2835.00	50.1	50.6	31.4	41.8	1.6	0.0	41.3	41.8	74.0	32.7	32.2	PK
10	3150.00	54.5	53.5	31.7	42.1	1.7	0.0	45.8	44.8	74.0	28.2	29.2	PK

No.	FREQ	T/R READING HOR	T/R READING VER	ANT Factor	AMP GAIN	LOSS	Duty Factor	RESULT HOR	RESULT VER	Limit	MARGIN HOR	MARGIN VER	DETECTOR
	[MHz]	[dBuV/m]		[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	[dB]	
4	1260.00	48.0	52.3	23.9	41.3	1.2	0.0	31.8	36.1	54.0	22.2	17.9	AV
5	1575.00	49.8	45.3	25.6	40.9	1.3	0.0	35.8	31.3	54.0	18.2	22.7	AV
6	1890.00	50.9	49.6	30.0	40.6	1.3	0.0	41.6	40.3	54.0	12.4	13.7	AV
7	2205.00	41.0	41.2	30.9	40.8	1.3	0.0	32.4	32.6	54.0	21.6	21.4	AV
8	2520.00	45.4	45.2	30.4	41.4	1.5	0.0	35.9	35.7	54.0	18.1	18.3	AV
9	2835.00	38.1	37.4	31.4	41.8	1.6	0.0	29.3	28.6	54.0	24.7	25.4	AV
10	3150.00	40.7	39.6	31.7	42.1	1.7	0.0	32.0	30.9	54.0	22.0	23.1	AV

REMARKS
ANTENNA TYPE:30-300MHz Biconical / 300-1000MHz Logperiodic / 1-3.2GHz Horn
CALCULATION RESULT=Reading + ANT Factor - Amp Gain + LOSS (Cable+ ATTEN.)+Duty Factor
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

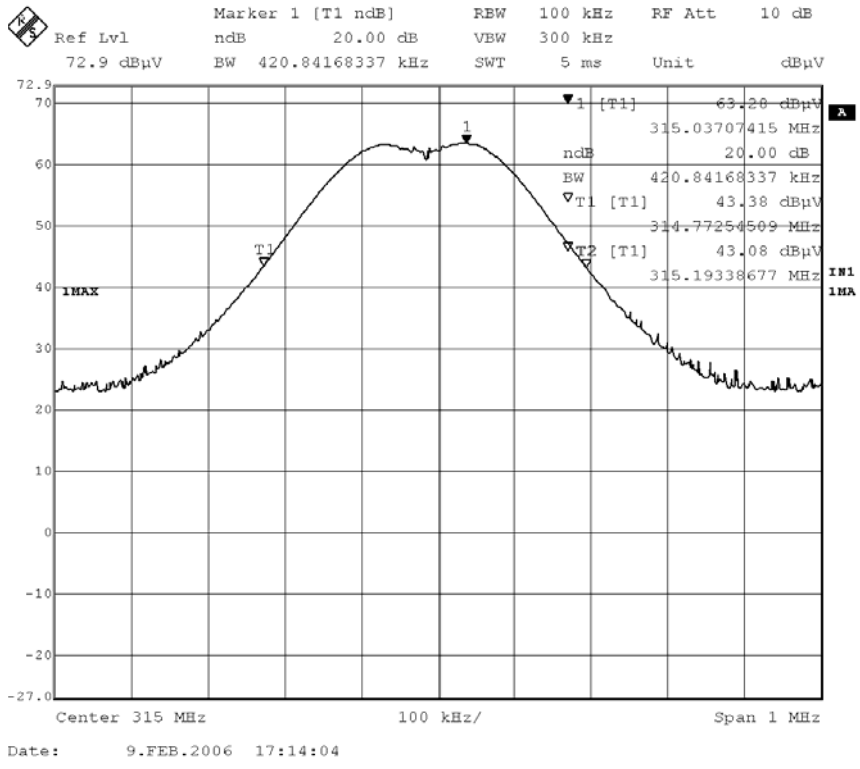
-20dB Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 26FE0028-HO
EQUIPMENT	: Passive Entry System (Hand Unit)	REGULATION	: Fcc Part15 Subpart C 231 (c)
MODEL	: TWB1U729	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 02/09/2006
POWER	: DC3.0V	TEMPERATURE	: 18℃
Mode	: Continuous Transmitting	HUMIDITY	: 30%
Axis	: Hor.: X-axis , Ver.: Z-axis	ENGINEER	: Hiroka Umeyama
Mode	: Transmitting		

Bandwidth Limit : Fundamental Frequency 315MHz X 0.25% = 787.5 kHz

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
420.84	787.50	Pass

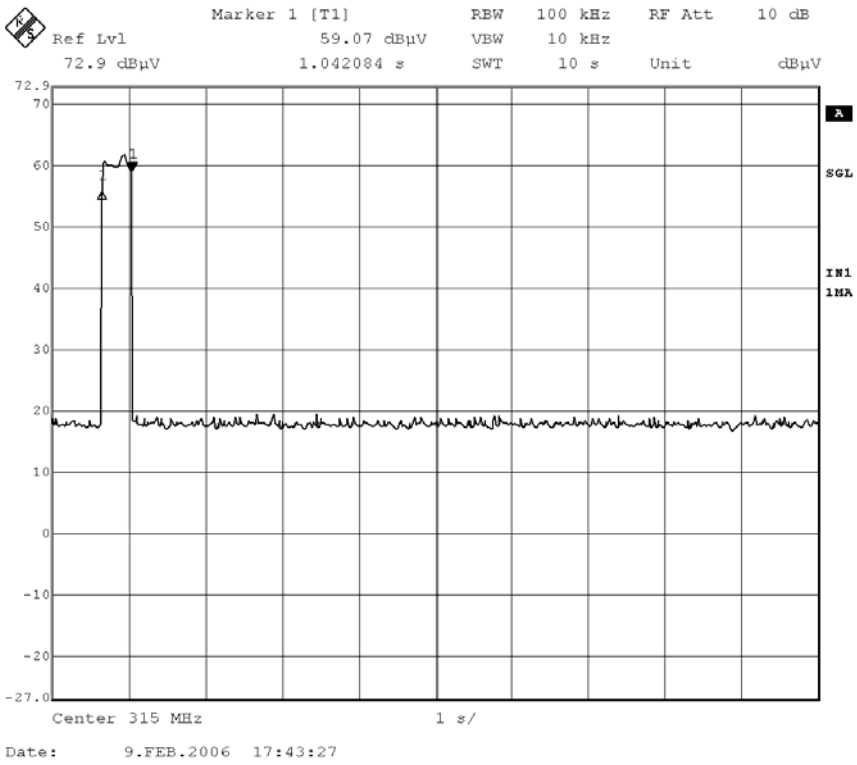


Automatically deactivate

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY	: Alps Electric Co., Ltd.	REPORT NO	: 26FE0028-HO
EQUIPMENT	: Passive Entry System (Hand Unit)	REGULATION	: Fcc Part15 Subpart C 231 (a)
MODEL	: TWB1U729	TEST DISTANCE	: 3m
S/N	: 1	DATE	: 02/09/2006
POWER	: DC3.0V	TEMPERATURE	: 18℃
Mode	: Continuous Transmitting	HUMIDITY	: 30%
Axis	: Hor.: X-axis , Ver.: Z-axis	ENGINEER	: Hiroka Umeyama
Mode	: Transmitting		

Time of Transmitting [sec]	Limit [sec]	Result
1.04	5.00	Pass



99%Occupied Bandwidth