EMI TEST REPORT

Test Report No. : 24BE0043-HO-1

Applicant	:	**Alps Electric Co., Ltd.**
Type of Equipment	:	**TUNER UNIT**
Model No.	:	**28595EA**
FCC ID	:	**CWTWCU11**
Test standard	:	**FCC Part 15 Subpart B : 2003 Class B**
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.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : January 6, 2004

Tested by : K. Adachi
Kenichi Adachi
EMC Service

Approved by :
Naoki Sakamoto
Group Leader of EMC Service

NVLAP®
Lab code: 200572-0

This laboratory is accredited by the NIST/NVLAP, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.

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

CONTENTS **PAGE**

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	:	TUNER UNIT
Model No.	:	28595EA
Serial No.	:	Dec/10/2003 283
Country of Manufacture	:	Mexico
Receipt Date of Sample	:	December 10, 2003
Condition of EUT	:	Production prototype

2.2 Product Description

Alps Electric Co., Ltd., Model No: 28595EA is the receiver. To receive ASK RF signal(315MHz), and to output demodurated signal to Body Control Module(BCM).
The clock frequency of EUT is 65.13833MHz.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B : 2003
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	ANSI C63.4: 2001	Class B	N/A	N/A*1)	N/A
Radiated emission	ANSI C63.4: 2001	Class B	N/A	9.7dB 911.923MHz, Horizontal	Complied
*Note: UL Apex's EMI Work Procedure QPM05. *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.
*The local oscillator frequency of EUT is processed with IC chip. But this frequency is used only in order for a mixer to generate the intermediate frequency of 10.7MHz. This digital part of EUT is operating in 65.13833MHz that is less than 108MHz. Therefore, the Spurious emission measurement for the upper frequency was up to 1GHz based on Section 15.33(b)(1).

3.3 Additions or deviations to standards

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

3.4 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications, FCC Part15 Subpart B : 2003.

3.5 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 data listed in this test report has enough margin.

3.6 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. No.2 semi anechoic chamber.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124
No.2 semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002. (Registration number: No.2:846015 Industry Canada: No.2: IC4247-2)
*NVLAP Lab. code: 200572-0

3.7 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

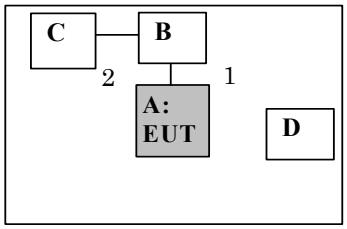
The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used : Continuous receiving of the conventional ASK Signal from the keyless transmitter. (This EUT have only one working mode.)

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

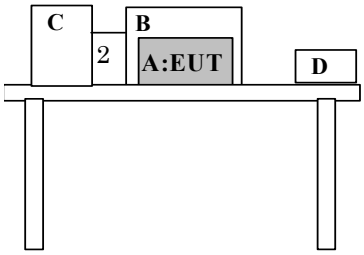
4.2 Configuration and peripherals

Top View



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

Front View



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Tuner Unit	28595EA	Dec/10/2003 283	ALPS	CWTWCU11	
B	BCM(Checker)	N/A	N/A	ALPS	-	
C	Battery	B19L	161001C	Panasonic	-	
D	Transmitter	282686Z	N/A	ALPS	CWTWB1U429	

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	Signal cable	0.3	N	Polyvinyl Chloride
2	DC power cable	1.3	N	Polyvinyl Chloride

SECTION 5: Radiated Emission

5.1 Operating environment

The test was carried out in No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2 m.

Temperature : See data
Humidity : See data

6.2 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.

6.3 Test conditions

Frequency range : 30MHz – 300MHz (Biconical antenna) / 300MHz – 1000MHz (Logperiodic antenna)
Test distance : 3m
EUT position : Table top
EUT operation mode : Receiving mode

6.4 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 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
Detector Type	Quasi-peak
IF Bandwidth	120 kHz

6.5 Results

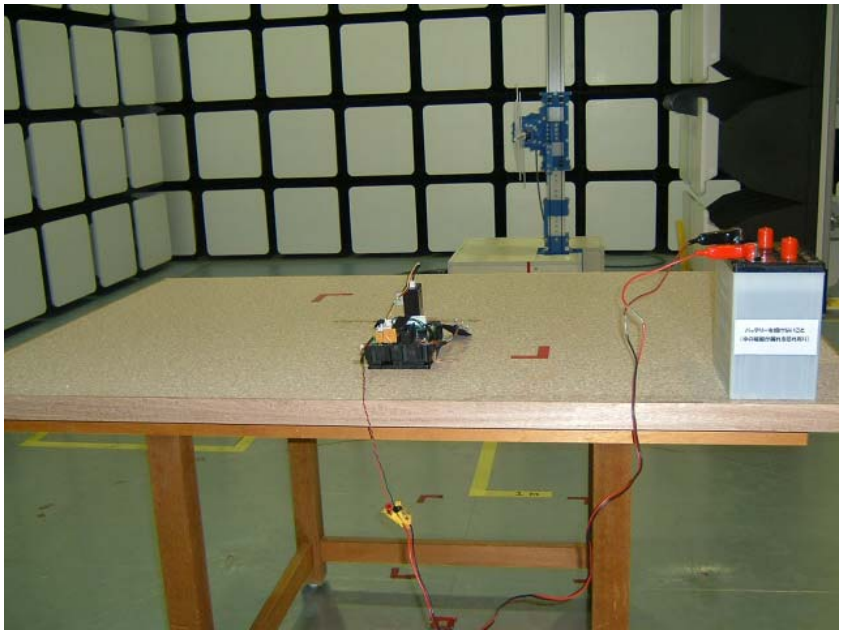
Summary of the test results: Pass
Date: January 6, 2004 Test engineer: Kenichi Adachi

APPENDIX 1: Photographs of test setup

Radiated Emission

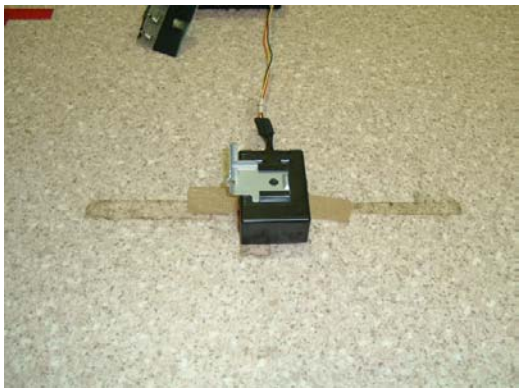
Front

Rear

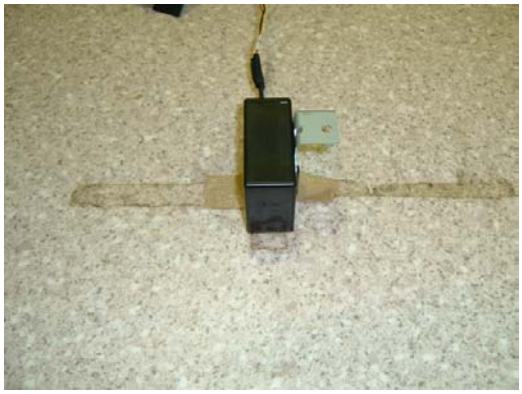


Worst Case Position (Horizontal : Z-axis/ Vertical: Z-axis)

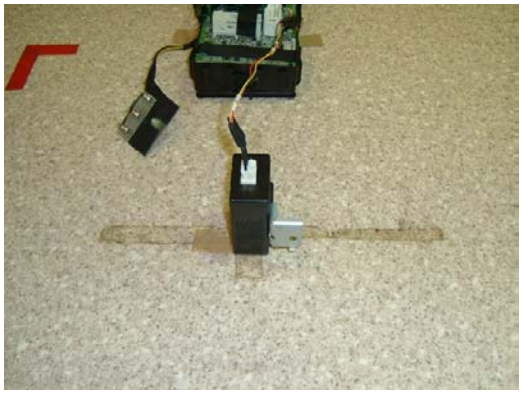
X-axis



Y-axis



Z-axis



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	2003/04/11 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2003/01/31 * 12
MRENT-06	Spectrum Analyzer	Advantest	R3273	RE	2003/10/31 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2003/05/08 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2003/04/17 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/04/28 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/04/28 * 12
MCB-01	Car Battery	Panasonic	B19L	RE	Pre check

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
Date : 2004/01/06 13:51:02

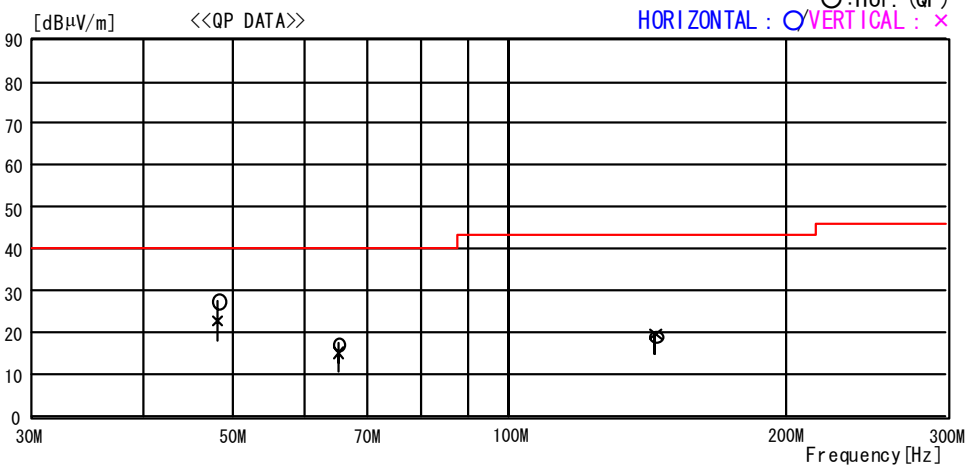
Applicant : ALPS ELECTRIC CO.,LTD
Kind of EUT : Tuner Unit
Model No. : 28595EA
Serial No. : Dec/10/2003 283

Report No. : 24BE0043-HO
Power : DC 12V
Temp℃/Humi% : 22deg.C. / 35%
Operator : Kenichi Adachi

Mode / Remarks : Z-axis

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

×:Ver. (QP)
○:Hor. (QP)



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	
----- Horizontal -----										
1	48.079	32.7	11.7	6.8	23.7	27.5	40.0	12.5	356	170
2	65.139	26.5	7.3	7.0	23.7	17.1	40.0	22.9	381	47
3	144.196	20.3	14.4	7.6	23.0	19.3	43.5	24.2	239	270
----- Vertical -----										
4	48.077	27.8	11.7	6.8	23.7	22.6	40.0	17.4	298	91
5	65.139	24.3	7.3	7.0	23.7	14.9	40.0	25.1	264	131
6	144.213	20.4	14.4	7.6	23.0	19.4	43.5	24.1	274	102

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz-
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN

DATA OF RADIATED EMISSION TEST

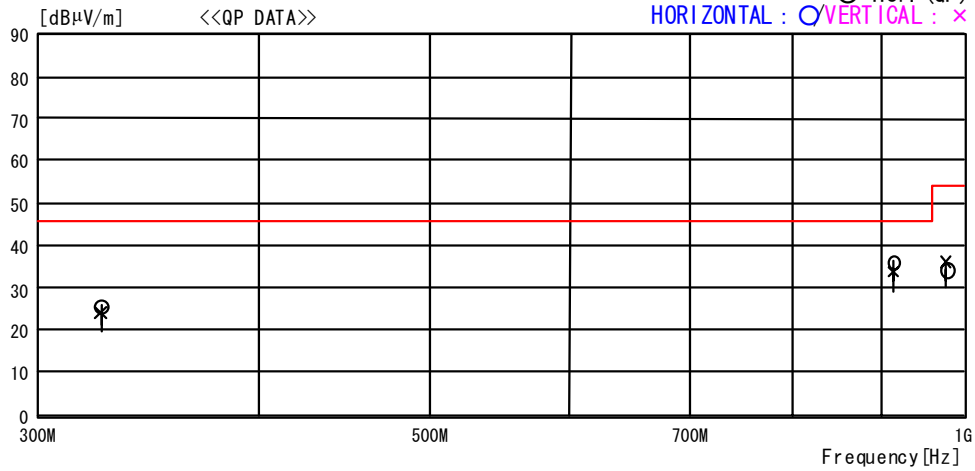
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/01/06 13:07:15

Applicant	: ALPS ELECTRIC CO.,LTD	Report No.	: 24BE0043-HO
Kind of EUT	: Tuner Unit	Power	: DC 12V
Model No.	: 28595EA	Temp℃/Humi%	: 22deg.C. / 35%
Serial No.	: Dec/10/2003 283	Operator	: Kenichi Adachi

Mode / Remarks: Z-axis

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

×:Ver. (QP)
○:Hor. (QP)
HORIZONTAL : ○ VERTICAL : ×



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	
----- Horizontal -----										
1	325.687	25.3	15.1	8.6	23.2	25.8	46.0	20.2	100	219
2	911.923	27.3	21.5	10.6	23.1	36.3	46.0	9.7	100	298
3	977.059	23.4	23.2	10.8	23.0	34.4	54.0	19.6	100	300
----- Vertical -----										
4	325.687	23.7	15.1	8.6	23.2	24.2	46.0	21.8	168	167
5	911.924	24.6	21.5	10.6	23.1	33.6	46.0	12.4	114	126
6	977.059	25.1	23.2	10.8	23.0	36.1	54.0	17.9	114	121

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz-
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN